COMPUTERWORLD

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System 21 Deliveries Begin Oct. 15

Viatron to Offer \$99/month Computer in 1970

By Ronald A. Frank

RI DEORD Mass Deliverie of System 21 will begin Oct 15 in the Boston and New York areas, Viatron Computer Systents announced this week About 100 of the terminals which rent for \$39/month and up, will be included in the initial dunments, a Viatron spokesmar

At the same time Vintron an nounced two general purpose computers, its first, for delivery next year, and a new tape drive never at ordered from reeds of computer compatible tape

The firm also announced that all its products would be for sale for 48 times monthly tent. Viafron formerly had said it

The smaller of the two computers the 2140, will rent for word memory 8 input/output channels to support System 21 terminals, and assembler and macro languages with utility sub-Viatron officials reflused to release any additional information on the software. The larger computer, the 2150, will rent for \$199/month with an 8K 16-bit word memory, hardware multiply/divide, and 24 input/output channels. In addition to the 2140 software, the omputer will have a Fortran

Both computers will have LSI/ MOS circuitry, three index regis- everything, Viatron offers color

EDP System for \$338/month?

Viatron isn't saying, but thut's the way it seems to add up viation is n i saying, but that is the way it seems to add up. The price includes a computer with 8K li-6bit words, three index registes—and hardware multiply/divide_a_CRI terminal with incroprocessor and keyboard, two Viatape tape drives, a printing robot—and a card reader punch adapter. The only additional units to be supplied by the user are a Selectric Typewriter for the printing robot and an IBM 29 card reader/punch.

By contrast, the basic IBM System/3 with 8K bytes of memory,

printer, and card reader/punch rents for \$945 per month

more strong channel The tape drive will be available

in 800-bit/in . 9-track and \$56/800-bit/in 7-track configu-rations for \$60/month. The pince will include software for pooling, blocking code conver-sion, and editing, the firm said System 21, which Viatron modestly calls "The Everything Machine '

is basically a CR1 terminal and microprocessor. The \$39/month system includes a CR1, two Viatape cassette tape recorders, a microprocessor, and a keyboard.

Bells and whistles, such as card reader/punch adapter, printing robot, and automatic multiple input/output, bring the price up to \$117/month. The user must supply his own IBM 29 card reader/punch and a Selectric typewriter for the printing robot. (There is still some question ahout how many feature pul on any one terminal)

Basic Support Still Free

As NCR Separates Prices DAYTON, Ohio - NCR has Presently signed customers' conunnounced an approach to separate pricing that is quite differ-ent from the unbundling philosthe company says

ophies expressed by the other major computer manufacturers. In effect, systems support, software, and educational services will be provided partly free and partly on a charge basis with the amount of giveaway de pending on the rental value of

The only example given was that an allowance of approximately 30 man-days of systems support will be given free for each \$1,000 per month rental

The new systems support allocation will apply to all new ustomers who sign before Jan.

1970, with the yet-to-be-an-ounced education and software credits cutting in after that date

tracts will be honored as written,

the company says.

R. Stanley Laing, NCR's president, said, "We do not feel that total separate pricing, with its unknowns in the area of final customer costs, is "e best answer to the computer user's needs. On the other hand, the concept of overall package pric ing has in many cases presented the customer with an undefined level of services and at the same time has tended to penalize cus tomers who do not need a high

level of support. The cost, presumably per hour, The cost, presumably per nour, of systems support above the "30 man-days per \$1,000 per month rental" was not spelled out. Charges apparently will be hased on the level of professional skills required.

Field engineering was not men-

will enable small users to interconnect multiple System 21 terminals (up to 24) with a central processor at a remote sile for hatch processing

The card reader/punch adapter and tape drive will allow the user to configure a small system that can interface by cards, tape, or (Continued on Page 4)

A mock-up of Viatron's new 2140 computer, left, as it would be used with a System 21, right. The message on the screen read

New, More Powerful Operating System Announced for the Medium-Scale H-200s

well users operating medium-scale 200 series processors (48K 1200s and up) soon will have the capability of a much more powerful operating system.

The new Honeywell operating system, called OS/200, allows Mod I and Mod II users complete upward compatibility. It was developed by the Atlanta branch office, and has been adopted as a supported piece of systems software by the company. Dual job streams, com-munications, and data transcription can alt be run simultaneous ly within the system, permitting greater flexibility and more production for the machines, according to the company.

Up to eight concurr tions can be controlled simultaneously on machines up to the 4200. Honey well said. Scheduled for delivery during the fourth quarter of this year, OS/200 will offer serious competition to IBM's DOS, as well as to the other widely used operat ing systems available from major manufacturers, Honeywell said

Communications Strength One particular area Honeywell feels that OS/200 offers great strength is in the use of communications in a multiprogrammed environment. Unlike IBM's DOS, which will permit communications only at the expense of one of the foreground partitions (only three partitions are permitted), OS/

nits the operation of dual job streams, communica-tions, and the five permissable data transcription routines

Dynamic Relocation Dynamic program relocation, the process of moving a program around within the memory without recompiling or addition-al link-editing, is fully supported within 05/200, the company said. Partition sizes are readjusted as the job stream frees up or requires additional memory. The user can assign partition priorities, allowing full con-trol of the execution of every job, the company said

Memory requirements for the resident system vary from about 16K for the single-job environ-ment to about 24K for the full configuration. This represents a size range from about twice that of DOS to about one and onehalf that of DOS. The company feels this extra core requirement is justified by the increased capais justified by the increased capa-bilities and speed of operation. Explaining the potential cus-tomer savings, Honeywell point-ed out that a user who might normally use a 65K 360/30 could now use an 80K H-1250. Though the 1250 is more ex pensive, Honeywell said, the additional speed and channel capabilities of the 1250 would allow

The limited requirement for operator intervention was point-

the use of the system and, even ing a multiprogramming environ ment. Under DOS, the user still has most of the responsibility for proper partition allocation proper program location. Using the dynamic re-allocation features of OS/200, the user need plan only peripheral and central processor utilization when selecting the job stream

Proper Use Important

Emphasizing the importance of proper use of multiprogrammed systems, the company explained that it would not be possible for users to realize the full potential of the OS/200 system unless they were willing to schedule jobs carefully and to plan the overall flow of work.

On the Inside Data From 50 Lines Pooled Onto Tape

No User Benefits Seen In Standard Languages

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IIA Wants to Broaden Base, Viewpoint Of National Commission on Copyrights

WASHINGTON, D.C.:- The Information Industry Associa-tion has recommended that tion has recom creators of information systems. products, and services be given membership on the proposed Na-tional Commission on New Tech-nological Uses of Copyrighted

The recommendation was among several made by the as-sociation to the Senate Judiciary mmittee for possible chang to the copyright revision bill. As the bill now stands, a 23-mem-ber commission headed by the ibrarian of Congress would be created with two members from the Senate, two from the House seven from among authors and other copyright owners, seven works, and four from the general

Mark II Prices Will Increase 8% on Dec. 1

BETHESDA, Md. - General Electric is raising the price of its Mark II time-sharing service 8% in the U.S. on Dec. 1, GE announced this week. Prices will rise from \$10 to \$11 per hour from 33 cents to 35 cents per computer resource unit, Storage charges will remain at \$1 per storage unit per month, GE said. The increase has been made necessary by increased operating costs, including higher costs for computer equipment, com-munications, and customer sup-port services, GE said.

port services, GE said.

To counterbalance the increase, GE announced that new Basic and Fortran language features and extended file capabilities would be available to users by

vear-end Prices of the Mark I service will

remain the same. GE said "An increase in Mark II prices is now necessary if we are to continue offering the most comprehensive and up-to-date time-sharing service..." said W.R. Eaton, general manager of GE's information service department.

COMMUNICATION Talk to Tally

or cell Tally, 1310 Me et, Seattle, Washingt

The association has proposed a 21-member commission to be appointed by the President. Five mbers would be named from each of four groups: auth copyright owners, users of copy-righted works and information, creators of systems and prod-ucts, and the general public. No restriction on the chairman was

recommended The association recommended the registrar of copyrights, the President's science advisor, and the chairman of the Federal Communications Commission be

ex officio members. The association also has proposed a different name, the na-

advanced technologies on works

The association also recon ended charter changes that ould "help focus the charter on the problems and op-portunities created by applica-tion of these technologies." said tion of these technologies," sa William T. Knox, association

The recommendations resulted from an association-sponsored meeting in July on "Copyright and Related Protection for Information Age Products."

The purpose of the commission would be to study the impagt of computers and other advanced technologies. technologies on copyright con-

.An Invitation

If you are a former newspaperman now working in the computer field, Computerworld may have a full time position on its news staff waiting for you.

In two years, CW has become the leading publication for computer users and the only newspaper in the field. This growth has created new openings on our news staff for persons with both newspaper and computer experience.

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hard to ignore



You just can't walk away from it. Adpac gets programming - results like no other language ever has. Like programs being writen two three times laser than in Cobol. And programs maintained with half the difficulty. That's Adpactins new "structured" programming language is producing the kind of results you've been paying for but not getting. Available now for IBM System 350 computers, other makes in 1970. Technical service and programmin returning magnic dise. With Computing Languages Corporation 101 Howard Street, San Francisco, California 94105.



Artist's sketch of Key Logic terminal

Input Data Preprocessed **By Key-Disk-Tape System**

NEW YORK - A new multi-ple-station key-to-disk-to-tape system calculates extensions, performs editing, formatting, and at least part of the total verification. It has been anwerification. It has been an-nounced for delivery in January. The KeyLogic system, from Penta Computer Associates, uses IBM 029 keypunch keyboards for the original entry. A display of last character entered and its field position is provided as well as an error indicator that lock the keyboard. It handles records of up to 200 characters. Check and characters that must match the programmed field deftion are automatically veri-

The company says that during operation, data flows from the operation, data flows from the terminal through an 860-nsec central processing unit (a Redcor 70) to a 2,000,000-character-capacity head-per-track disk storage unit (manufactured by Burroughs). From the disk, validated data is transferred to a master tape that can be prod on the mainframe Recy ire data entry process is under computer control, Penta

In addition to data entry, veri In addition to data entry, veri-fication, and validation, the Key-Logic system performs some 20 other major functions. Record counts can be generated, batch totals taken, and several batches within a file can be merged and sequentially from disk to tape. The system also perform auto-duplication, auto-insertion, auxiliary duplication, check digit (Modulus 7, 10, and 11), auto-

plication functions. plication functions.
The system is designed to replace any keypunch installation
with 12 or more units. Twelve
KeyLogic terminals can match
the output of 18 keypunch stations, realizing substantial savings in preparation time and in mainframe time, the company claims. Up to 64 KeyLogic ter-minals can be used with the

ing terminals, central processing unit, disk unit, a synchronous drive tape unit, an IBM Selectric supervisor's console, and soft-ware package – may be pur-chased or leased. A 12-terminal installation, for examp sell for approximately \$ sell for approximately \$126,000 or lease for \$3,420 a month. Penta is located at 445 Park Ave., New York, N.Y. 10022.

Vigtron Announces First Computers service for on-site repair or re-placement of units, the company (Continued from Page 1)

existing larger systems, the com-

The 2150 computer with System 21 terminals and tape card, and printer attachments appears to offer the user much greater flexibility than the IBM System/3, which uses noncompatible 96-column cards and has neither tape nor tions capabilities.

Viatron plans to create a net-work of service depots which will provide 24-hour emergency

NORTHRIDGE: Calif. - "Indently running (multiprogramming) in a mini is something new. System 21 Deliveries Begin Oct. 15,

said. Normal maintenance will be based on the concept of replacement rather than repair ervice, a spokesman said.

The service centers will be part

The service centers win be pair of a network of dealers who will rent, sell, service, and provide systems support for Viatron products, the company said. The hasic System 21 microprocessor has a 512-word, readonly memory: a 400-character read/write memory; two tape channels; automatic skip, duplication, and left zero fill; auto

matic upper and lower shift con-trol; and automatic output to a selected data or tape channel. The larger micropr necesor also

The larger microprocessor also has automatic input from a se-lected data or tape channel, automatic tape search, auto-matic tape validation, editing and automatic reformatting, a key verification.

The Viatape cartridge recorders se 7-level ASCII code and have a read/write rate of 1,250 cha

tape drive will have a read/write rate of 2,200 char/sec to interface with the microprocessor, company said

The printing robot operates a Selectric typewriter at 12 char/ sec. It provides format control, backspace, tab, carriage return, and indexing capabilities.

Proposed Data Bank Safeguards May Become Law in California

or of communications for IBM

Cunliffe, the only manufac-

turer's representative present,

hardware and software any re-quired safeguards, but it did not

want to get into the political aspects of the problem.

Victor Fazia, a consultant to the committee, told CW, "The question then becomes, how

much extra expenditure can y

his is a political decision Views expressed by the testify ing experts included the follow

justify to put in the safeguards?

Specific laws will be needed

to punish those who improperly

obtain or misuse computerized

Laws should give the in-

LOS ANGELES - Protection of personal data gathered in centralized data files has become an issue in California. Recommendations will be presented to the legislature in January, If they are received successfully, ornía will become one of the first government groups to enforce safeguards upon dossies

ction and use. The target is both government and private industry files. Al the conclusion of hearings held last week, the possibility further action was con-

State Assemblyman William T. Bagley (R-San Rafael), chairman of the Assembly Committee on Statewide Information, sponsor of the hearing, is a strong advo-cate of "the Republic's right to cate of "the Republic' know." He became into the privacy problem while legis-lating the California Records Act which gives citizens open access to government information. A iral outgrowth was individual access to one's own dossiered

data and protection for how it is Among the computer people

who testified were Willis H. dividual the right to inspect all information about him that is stored in a data bank and to Ware chairman of the comi sciences department at the Rand Corporation; Robert Brictson, have errors corrected.

D A "state data availability of-Corporation, Robert Brickson, sociologist, System Development Corp.; Lance J. Hoffman, a staff associate at Stanford Linear Accelerator Center; Donn B. Parker, director of computer fice" should be created to insure

tained to insure privacy of planning and operations for Stanford Research Institute, and Laws protecting privacy would spur development of hardware and software safe-guards; these safeguards are not John Cunliffe, corporate di

ailable in existing systems. □ Licensing of personnel work-ing in privacy-sensitive areas should be considered. Security clearances for key personnel

may also become necessary. There should be laws to penalize those who invade the of data files or who

privacy of misuse them Chairman Bagley's committee consists of a five-man legislator group and an 11-man advisory group. The advisors cover legal,

technical, and social expertise.
They admit to being influenced in their work by Alan Westin,
Columbia University law professor, through his publications ntotions hefore Congress on the privacy

Mini With a Difference

Optional Independent Memories Offered The Comp-16, from UniComp

ne comp-to, from Unicomp, lnc., has this as an optional feature. The option is designed primarily to allow processing to continue in one of the memories while the other is involved in slow I/O functions. But, the company says, the two memory modules also can process two

internal instructions in parallel. The basic system has a 1-4sec cycle and a 4K memory module. It costs \$9,800 (in single quantity). The additional 4K module and a switch to allow independent as the state of the time 4K. dent operation of the two 4K banks raises the price to

\$15,800 UniComp, located at 18219
Parthenia St., has designed a
fairly standard instruction repertoire. Optionally, it will supply
hardware to multiply/divide/
square root (\$4,300) and up to four groups of four interrupts. Other options include read-c

memory and/or scratchpad me mory. All peripherals are extra-cost. They include an ASR-33 Tele-



Unicom's Comp-16 type with paper tape I/O and

interface (\$1,750) and separate per tapes, magnetic tapes, and a disk interface.

Deliverable software includes a relocatable assembler, Basic, conversational Fortran, multiple-precision floating point mathematical subroutines. spe cial real-time packages, and hardware diagnostics, the company

Applications packages include satellite navigation, fire control, radar tracking, telemetry data handling, process control, and real-time equipment testing.

Was Your CW Late Last Week?

If your copy of the Oct. 1 issue of Computerworld arrived late, we apologize. And we'll do our best to see that it doesn't

Like many new systems, our new distribution system had some bugs in it. We think the system is now debugged.

nputerworld formerly was printed in Boston and distribu ted from there. It is now printed in Chicago and distributed from there. The change was made to give us greater printing capabilities and faster distribution.

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M. Palterson, Executive Editor. Near r. Margaral Phetan, Circulation Men Supergion, Mary Upton, Typesetti

'U.S. Would Lose Without CBW'

Decision to Develop Weapons Based on War Games

WASHINGTON, D.C.—The Soriet Union would beat the United States in World War III if war games run by the Departing to used chemical and biological ment of Defense (DoD).

the nonintellectuals of both groups had already admitted that there were many things of

much greater importance to

them than privacy or personal liberty. They had selected a dif-ferent set of moral principles and

The under-30 intellectuals, Grosch said, feel a real commit-ment to what remains of social

liberty. They are not as con-cerned with such issues as their

cerned with such issues as their younger counterparts. However, he explained, both of these groups are primarily concerned with the social issues rather than with the purely moral issues. Only a small minority of any of these groups has any real concern over such issues as invasion of privacy; they are much more concerned with their ability to obtain credit for new purchases.

Ivan Flores, local IEEE Com-

puter Group chairman, ex-pressed violent disagreement with Grosch's contentions about

ople, but he did not explain

Grosch explained that, taking a

a different set of values.

gained little publicity until this year, when nerve gas killed sheep in Utah and injured soldiers in Okinawa. For the first time, some congressmen have opposed CBW research, and the Pentagon

CBW research, and the Pentagon has been forced to defend it. According to a Pentagon spokesman, nearly all informa-tion on war gaming is classified. But he did say that both the DoD and outside consultants such as the Rand Corporation regularly conduct computerized

war games.

In such games a scenario is prepared in which tactics and equipment to be used, weather conditions, and other variables are specified. One game may differ from another in only one variable, such as whether or not tactical nuclear weapons are to

or used.

After the initial conditions have been set, the war is "fought" by computer. Frequently this is a real-time procedure where opposing generals must make military decisions during the course of the "war," The war is fought using a com-puter model that attempts to late, as much as possible, an octual war

Nuclear Weapont Don't Help

The Pontagon spokesman said that in all cases where one side (either the U.S. or U.S.S.R.) used CBW and the other side didn't, the side using CBW won. Even if the other side used tactical nu-clear weapons, it would not win because its mobility and com-munications would be badly hampered by the need to op-erate with protective gear.

Specific examples of com-puterized war gaming as related to CBW are difficult to come by, but two have been published this but two have been published inter-fail. The Los Angeles Times cited one example stressing that CBW are difficult to handle and might have undestrable side effects on friendly or neutral bystanders. In these war games biological weapons were used to

puters showed that in stopping the Chinese army, hundreds of thousands of civilians might also be killed.

Another war game using CBW was described in the New York was described in the New York Times Magazine, Sopt. 26. In the game, based on the 1962 Cuban missile crisis, the Army sprayed the island with an incapacitating (rather than fatal) biological agent. The Army de-clared success, with "96% of the

Cuban army incapacitated." But the study also showed that the disease would kill 1% to 3% of the island's seven million resi-dents, primarily babies and old The example also stressed the

difficulties in interpreting the results of computerized war games. According to the Times: Magazine article, "incapacitated" meant "headaches, 102-degree fever, diarrhes, etc." But the article quoted other Army of-ficers who said that rather than thers who said that rather than incapacitate the Cuban army, the symptoms would make them fight harder "precisely because they felt so miserable."

the Army's most recent budget request, it asked for \$350 million for CBW. Critics charge that the real CBW budget

is \$650 million. Chemical weapons are not re chemical weapons are not re-stricted to nerve gases and other weapons where minute quanti-ties can kill hundreds of people. Weapons regularly used in Viet-nam, such as napalm, white hosphorus, and tear gas also are scluded.

The U.S. helped write the 1925 Geneva Protocol, which bans the first-time use in wartime of CBW. But it has never been approved by the U.S. Senate, so it is not binding. A group of senators, lead by Sen. Gaylord Nelson (D-Wis.) are urging President Nixon to sub-mit the Protocol to the Senate. There is one difficulty, however: ILS use of chemicals and sases U.S. use of chemicals and g in Vietnam probably violates the protocol,

Grosch Warns Not Everyone Concerned About Loss of Privacy, Personal Liberty

NEW YORK - "Why wasle energy fighting the coming of data bases? They're coming any-way, so let's work out ways to protect ourselves, in advance!" Dr. Herbert Grosch, director of the computer center at the Na-tional Bureau of Standards, told a joint meeting of the local IEEE Computer Group and the ACM.
Originally scheduled to be a debate between a member of Rep. Cornelius Gallagher's (D.N.J.) staff and Dr. Grosch, bureaus (in Dallas, Texas), also group because Gallagher's staff per did not appear.

practical issues, including the current lack of communication between a consumer and a credit bureau. He protested the lack of recourse available should a had credit check be erroneously entered into a person's record. The sudience parties between the discussions, Several people protested Grosch's basic contentions.

Four Pieces of Society

Grosch divided society into four groups: under-30 nonintel-lectuals, over-30 nonintellec-Grosch raised several moral and over-30 intellectuals. Examining

FTC Refuses Comment on Report It's Probing Welcome Newcomer

WASHINGTON, D.C. - Welcome Newcomer is being in-vestigated by the Federal Trade Commission (FTC), according to the Washington Daily News. The

Chilton Corp., owner of one of the first computerized credit bureaus (in Dallas, Texas), also owns Welcome Newcomer. It has been accused of using Welcome r. It has Newcomer hostesses as investiga-tors to gain information for its credit files [CW, May 14].

Like the better known Wel-Like the better known Wei-come Wagon, Welcome New-comer greets the new resident, gives her gifts from local mer-chants, and gives local merchants

But unlike Welcome Wagon, Welcome Newcomer hostesses ask credit-related questions, such as: husband's present and previous employer, oil company credit cards used, and names of stores with which the family had

credit. Answers to these quescredit bureau, which passes the information to the credit bureau information to the credit bureau in the town where the family lived previously. That credit bureau uses the information to update the family's file and then forwards the file to the credit

Chitton admits that in at least some cases, the people inter-viewed do not know that this is

Rep. Cornellus E. Gallaghor Rep. Cornellus E. Gallaghor (D-NJ.), chairman of the Right to Privacy Inquiry, said he supported the FTC investigation. "As pleasan! and as useful as such visits frequently are, it appears that a call by a Welcome NewComer hostes sets in motion a flow of personal information of the property of the pro tion over which the individual may have little or no control," he said. "The individual citizon must be able to limit the spread of personal data about himself."

theme from James Blish's Tartheme from James Blish's 10r-rent of Faces, we may end up living in such great density that the only way to achieve any mental survival will be to lose

where the flaws were.

the need for real privacy. Privacy cannot long survive, Grosch con-tended, when you have 100 million people living in an area the size of New York City. Solutions to a problem of this

Solutions to a propier of this scale are only possible, one participant pointed out, when a reasonable majority of the population feels real concern over the issues involved, a situation

SALE MERGER

pany servicing Ohio and West Virgin is seeking sale to or merger with company able to furnish capital needs for rapidly expanding business. Company now operates two date processing companies engaged largely in banking and commercial fields. A third center is scheduled to begin operations in November, 1969. Gross seles should exceed one million dollars in current fiscal year with exciting future growth potential. Contact: Harry Robinson, C.P.A., 323 Second Street, Marietta, Ohio, 45750.

A bit of Logic for Computers

Maintanance Service by RCA For Computer Paripheral Equipment Reduca downlime and service headaches, with planned service from RCA's specialists on communications and data processing equipment.

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RG/I



Data Device Pools Communications to Magnetic Tape

LOS ANGELES - A system that pools transmitted data from 50 or more communications lines through a mini-computer

lines through a mini-computer and onto magnetic tape for com-puter input has been announced. The DataCentral System, from Computer Machinery Corp., Computer Machinery Corp., checks received data for errors and message validity before pro-cessing onto computer-com-

The system interfaces with The system interfaces with Data-Phone data sets or equivalent modems on either private wire or switched network service. It is designed to accept input from terminals including Teletype Models 33, 35, Teletype Models 33, 35, and 37; IBM 1001, and 1050; Burroughs TC-500; and Touch-Tone phones. The system is de-scribed as compatible with Bell

The company, located at 2000 Stoner Ave., says that the basic

Stoner Ave., says that consists of a computer, a multiplexer, a monitor teletype-writer, one magnetic tape unit, one magnetic tape unit, and operating programs. It is priced to rent for \$1,000 per month, plus \$50 per month per

The basic system can be aug-mented with a second mini-com-

New Products

puter, with both units receiving data simultaneously, thus giving a safety factor in case of a malfunction, according to the company.

A UNIQUE

APPROACH TO

DOLLARS

Software support includes a package that reports statistics such as number and duration of calls and number of records transmitted. Initial delivery is scheduled for the summer of

Small T/S System

ENCINO, Calif. - A small time-sharing computer system, the Minits II, permits up to 24 simultaneous remote users to communicate with the Univac 1108 on a time-sharing basis, according to the manufacturer, Jacobi Systems Corp.

The 1108 user can accompli program compiling and debug-ging on the Minits II at a cost of roximately \$2 per terminal ar, claims the company, in-ad of using the 1108 for

tine time-consuming tasks. uring Minits II operation, the 1108 can continue to operation, the 1108 can continue to operate in its normal modes under Exec II or Exec 8. With the Minits II, 32 remote users, 24 of them simultaneously, can make



ase of the speed and mass use of the speed and mass storage of the 1108. Engineers and programmers can enter problems from teletypewriter terminals at their desks. Some and programmers can enter the problems from teletypewriter Mathetron III can invert an II terminals at their desks. Some by II marks, solve ten simultanticular their desks completely the consequence of the simultanticular their desks completely the consequence of the simultanticular their desks completely the consequence of the simultanticular their consequence of the con

GOLD STAR FILES

ADDRESS __

DATA BANK SAFES

STATE

answers being returned in

Features of the system include advanced conversational soft ware; maximum response time of only four seconds (2.5-second of only four seconds (2.5-second average); core storage of 32,768 (8-bit) bytes; and a 512,000-byte head-per-track disk memory, ac-ording to the manufacturer. The Minits II is priced at \$160,000. Delivery is 90, days after receipt of order, the firm says.

The company is located at 16661 Venture Blvd.

T/S Terminal

WALTHAM, Mass. - A time-sharing, programmable, elec-tronic calculator system is avail-able from Mathatronics Corp. The Mathatron III central station memory unit will serve from one to 16 terminals simultaneously, including a Mathwriter calculator keyboard.

Each terminal operates com-pletely independently as an al-gebraic calculator and can access the entire memory. The memory unit: with its 160 addressable pro gramming banks, allows multiple users to share formulas of com-mon interest or to solve problems. Commonly used formulas are preprogrammed from the Mathatron III program library.

As the problem is entered, the Mathatron III automatically executes problems according to the rules of algebra. No machine language is involved. Features include: algebraic notation, programmable with up to 2816 programmable with up to 2816 pro-gram steps; 160 program loca-tions; conditional branching; conditional decisions; sub-routines; and 128 storage regis-

By temporarily clearing the

DATA COLLECTION
A complete line of portable card punches for tab cards and plastic cards and badges Electric models plus annufationsous printing and punching available.

ZIP



many as ten variables.

The new calculator can be used with any ASCII code terminal ding CRT), either direct wired or acoustically coupled. Avsilable Mathatronics terminal equipment and accessories in-clude: the calculator keyboard; ASR33TY 'teletypewriter; X,Y plotter; accountical Mathwriter terminal; paper tape reader; and paper tape punch. The Mathatron III memory unit is priced at \$7,840; the Mathwriter terminal x \$950.

Mathwriter 'terminal 'at \$950; and the teletypewriter terminal at \$1,200, One Mathatron Hi and two teletypewriter terminals is 'priced at \$1,993 per user terminal

The company is located at 241 Crescent St.

. Office Computer

SAN FRANCISCO - A small computer has been designed to function within the normal of-fice environment. Called the Cal Systems computer, the unit is offered by California Office Systems Corp. The system does not require new languages,

not require new languages, forms, procedures, or skills, ac-cording to the company. The computer interfaces with a tape-programming module and an electric typewriter that serves as both an input and output device, all contained in an office-size desk. office-size desk

A library of tape cassette programs covering almost every of-fice routine and business opera-



tion is prerecorded for use with the computer. Standard programs include in-

voicing, inventory control, ac-counts receivable, billing, payroli (including specific local and (including specific local and state deductions), and automatic

state deductions, and automatic retyping and editing. Besides being a self-contained work station, the system can serve as a data terminal with a printout-typing speed of 175 word/min

The price ranges from \$30,000 to \$50,000. Rental rates start at \$750/month. The device can be leased at \$600/month and up, depending on the term of the lease. Delivery is set at ten days.

The company is located at the Golden Gateway Center, 1

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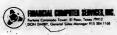
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The new KeyTran system will be demonstrated for the first time at the Fall Joint Computer Conference. See it at booth 2900.

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Editorials

A Foot in the Door

Whenever a new data bank is suggested, its supporters fend off critics by claiming that the data bank will receive very restricted use. But by some corollary to Parkinson's law, use of the deta bank seems to expand rapidly. A prime example of this is New York State's crime data bank, the New York State Identification and Intelligence System (Nysiis).

In 1966 Robert R. J. Galliti, Nysiis director, testified before a committee of the U.S. House of Repre tives. He assured the group that Information from Nysiis is confidential and is not available to employers."

Three years have passed, and the system is barely operational but New York State is already going against that initial assurance. Nysiis is being used to check on all Wall Street employees.

Childish Reaction

Are we to be reduced to the level of five-yeer-old children in order to cope with the misuses of computers by consumer-oriented companies? Henry Matusow, head of the recently formed International Society for the Abolition of Data Processing Machines, says that to solve the problem we ought to punch extra holes in computer-preparad cards and demegnetize the ink on checks.

This approach has some appeal to anyone who has spent fruitless days or weeks trying to get his bank to correct e statement or his department store to correct a bill. We all tend to behave like frustrated children when no alternatives seem to be available. But does frustration make it right to throw a rock through your neighbor's window when you're mad at him? Rubbish! That's no solution to the problem, just a release of pent-up

The problem is real. Many compenies appear totally onsive when someone complains about errors made through the use of computers in preparing bills, invoices, or bank statements

Force, however, cannot be the answer. It reduces the user to a savage and leaves the problem unsolved. If you find yourself in this situation, why not write to the company's president? It will accomplish far more toward getting your problem solved. It might also ninate future occurrences of the problem, something that rocks will riot do.





MCI Calling!

Letters to the Editor

Instructor Says Students Have Trouble Getting Jobs

I have read the two articles on Black Trainees by Joseph Hanlon [CW, Sept. 17 and 24] with a great deal of interest. I am an instructor in data processing at Diablo Valley College, a two-year junior college.

I have been teaching in this field for five years and have been instrumental in setting up a two-year program for students interested in positions as programmer trainess and operator trainess. My experience has been exactly that described by writer Haslon. That is, that employers are unwilling to hier an individual for the position of programmer traines can be also found that the state of the position of programmer traines can be also found that the state of the position of programmer traines can be also found to the programmer traines can be also found to the programmer traines and the state of the programmer traines are stated to the programmer trainess and the programmer trainess and programmer trainess. e been teaching in this field for five years large corporations simply require a four-year de-gree. It really doesn't matter whether the student knows anything about computers or about pro-

Some of my fellow instructors at other junior colleges are prepping students for the aptitude test because of the use of this test by many companies. It is really a sad state of affairs.

James Hammill

Diablo Valley College Concord, Calif.

Claims by Burroughs User Disputed by RCA Executive

Insperse By KAR LACCEIVE We feel it in excessary to answer G.D. Simon's letter (CW, Spst. 10) which leaves the impression he is dough the same things the same way on his 5500 as Equitable on their CM. The contract of the c syntax error free programs prior

to the first compilation:

After compilation a system-created diagnostic file can be interrogated conversationally to deterand the interrogated conversationally to determine the number and severity of compiler-detected errors. Interactive debugging aids (IDA) provide Oracle users the ability to provide Oracle users the ability to monitor and control the execution phase of the program

development cycle.

It is not clear why Simon stressed the fact that at it not clear why Simon stressed the fact that he does all of his work on one machine. As stated in the final paragraph of Computerworld's Aug. 20 article, Oracle's flexibility permits programs to be true on systems from either of two computer manufacturers

There are other major differences between the two types of systems which we would be happy to discuss at a convenient time with Mr. Simon, and others who are not familiar with the RCA Spectra

> Samuel Bookbinder Manager, Time-Sharing Markets

RCA Information Systems Camden, N.J.

NCI Doesn't Manufacture

It's true that NCI [National Computing Industries] markets disk packs for prices as low as those quoted [CW, Sept. 24]. But we do not manufacture disk

ture disk packs.

As a matter of fact, since we do not manufacture, we are able to pick and choose our sources very carefully and manufacture. The sources very carefully and manufacture that has been sourced to be sourced to be sourced to be sourced to the source of t ture disk packs.

Vice President - Marketing

National Computing Industries

Phoenix, Ariz.

Regulation of Credit Bureaus - Part 1

Critics Say Massachusetts Law Falls Short of Need

WASHINGTON, D.C. - The was filled for, D.C. I like strongest state law regulating credit reporting has been adopt-ed in Massachusetts. Meanwhile, action on U.S. Sen. William Proxmire's hill to regulate credit reporting has been suspended until this fall.

Proxime's bill [CW, June 11] covers all phases of credit report-ing and is intended to "enable umers to protect themselves against arbitrary, erroneous, and malicious credit information." The new Massachusetts law is similar to one part of the Prox-mire bill, and a Proxmire aide warned that the Massachusetts

law does not go far enough. The Massachusetts law requires that a credit grantor who refuses credit or an employer who re-fuses employment based "in whole or part upon a report from a credit bureau" must in-form the person of the fact and provide him with the name and address of the credit bureau that

The law also prohibits a credit bureau from reporting information on transactions (except bankruptcies) that occurred more en years ago: This, however, is already contained in the guidelines of the Associated Credit Bureaus (ACB) [CW

Credit bursaus are now being computerized, and San. William Prox mire has warned that if there is no regulation, they will become a national data bank. In addition, he warns, computerization will introduce a new sourced arrors, and past entrow will be used to be u may serve as a prototype for what happens in other states and in Washington, this four-part series considers the controversy surrounding tha new Massachusetts law, as well as the implications of

and professional staff member of the Senate Banking and Cur-rency Committee, called the new rency Committee, called the naw law "very desirable," but he warned that "it doesn't go far enough." In particular, the Massachusetts law does not cover reports to insurance com-panies about people trying to buy insurance. "Our hearing slowed that some of the most significant abuses occurred in the area of insurance reporting

pressed that the new law is too weak, and that employers and creditors will not bother to inform people that their rejection involved a credit bureau report. McLean supported the law in

McLean supported the law in this respect, saying that if a report contained a derogatory piece of information "it would be easy for an attorney to establish that the report was partly responsible" for the rejection. s, McLean expects the effect of the bill to be that m Agrch 191.

Ken McLean, a Proxmire aide will automatically cite the credit

bureau report if there is a derogatory piece of information

Critics of the bill disagree. The person must first find out th report was involved. The people this law purports to help. they charge, are exactly the ones this. Thus, employers and credit grantors will feel safe in ignoring the law they claim.

Few Other Laws

According to McLean, several other states are considering la o regulate credit reporting, but the only other state to pass such a law is New Mexico. That law closely follows the ACB guidelines and is generally w McLean said. McLean also noted that Oklahoma has had a law that Oklandma has had a law since 1910 requiring that reports be sent to the people reported upon, under limited circum-stences. But that law has never been enforced, he added.

Proxmire Bill in Committee Action on the Proxmire bill has

been suspended until this fall, according to McLean. The Sub committee on Financial Institu-tions of the Senate Banking and Currency Committee has com-pleted open hearings on the bill McLean expects that the com-mittee will need in executive tession this fall and probably

will approve the bill then, rehopes for Senate consideration
and reports that chances of
Senate passage in this session are
"good." It is not clear what action will be taken in the House.

and the Proxmire bill result in a person being told that something Is amiss in his credit bureau file but the person must visit the credit bureau himself to asertain the difficulty. Part two series tells what happened when two CW reporters went to the credit bureau to check their

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Letters to the Editor

U.S. Labor Aide Says Privacy Will Get Special Emphasis

The Secretary of Labor has asked me to reply to your letter of August 20, 1969, in which you request information regarding the specific identification of individuals who would be using a

cation of individuals who would be computerated job bank. Protection of the privacy of all persons using the services of the public employment offices, both applicants and employers, has always been the policy of the Department of Labor. Information recorded is limited to that which is necessary to assist the job seeker to obtain suitable employ-ment or training or to that necessary to help the employer fill his job vacancies. The department's employer fill his job vacancies. The operation is Manpower Administration is currently reviewing the need for adjustment in operational procedures brought about by the planned computerization of records. The issues related to maintaining the personal privacy of our clients will receive particu-

personal privacy of the control of t system is several years in the future. At the present time, within the Manpower Administration, there is only one computerized man-job matching system which is operational. This operation is in the State of Utah and is still undergoing changes and modifications. However, the program does provide modifications. However, the program does provide for matching applicants with job opportunities or, the reverse approach, that of matching jobs with available job applicants. Obviously, applicants must be identified in some way, in order to contact them when job opportunities are available. However, applicants' names are not used to provide the properties of the properties of the control purposes, matching entering the pro-tional calculation of the properties of the pro-tional calculation of the protection of the pro-tional calculation of the protection of the pro-tional calculation of the protection of the protection of the pro-tection of the protection of the protection of the protection of the pro-tection of the protection of the protect other agencies; only state employees have access to the stored data.

A less sophisticated system, computer-assisted matching of men and jobs, and matching of men and jobs, and matching of men and jobs, as foreward as "job Bank". It provides for a daily listing (computer printent) of all job opportunities in a Besignate and the state of the state sending a potential worker to a job that may have been filled earlier in the day. A record of the individual's visit to the public employment office is made and this record will include the individual's name. This procedure has been followed by the United States Training and Employment Ser-vice (USTES) for a number of years. However, there are very specific rules and regulations that govern, disclosure of information about either seminates or memoryer. Staff with the USTES and int or employer. Staff with the USTES and its affiliated state agencies are informed of these regulations to assure the privacy of each of our clients. In the operation of a Job Bank, applicant qualifications are not stored; job opportunity information is retained, however, for whatever rength of time is necessary to provide service to applicant and potential employer.

I hope the above information will be of assistance

to you in responding to questions raised regarding a nationwide Job Bank.

Deputy Assistant Secretary for Manpower and Manpower Administrator

U.S. Dept. of Labor neton D.C

Computerworld welcomes comments from its readers. Preferance will be given to letters of 250 words or less. Computerworld reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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Bob Davis of National Computing Industries offers advice on

"How to make a programmer happy"

"It doesn't take much, really, Just tell him that he may only have to do 10% of the documentation on his next program. That from now on he only has to do creative work and never has to do mechanical work. Tell him you will often cut his de-bugging time more than in half and his coding time by 90% or so, yet his programs will be up and running sooner and will rarely need attention later.

"And just for good measure tell him that every time he makes a change in any record you will furnish him with a list of every program affected by that change.

"Oh yes, also tell him that he doesn't have to worry about alphabetics, numerics, edit words, formatting and a dozen or so other frustrations. That formatting, spreading and creating of report lines from now on will be entirely automatic."

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COMPUTERWORLD

communications'

ernment will begin a one-year inquiry into all aspects of the

Among the questions to be explored are the need for regulatory control of data com-munications facilities and the re-

lationship between Canadian computer firms and the common

telecommunications industry.

Canadian Data Customers **Want Improved Services**

TORONTO, Ontario - As a result of mounting complaints from computer companies and users concerning communica-tions services, Bell Canada has created a new department to deal specifically with data com-

munications problems.

One of the main concerns of the new department, according to Palle Kiar, assistant vice-presi dent for data communication will be "to resolve interconnec-tion problems,"

The problems to which Kiar refers are vitally affecting Canadian firms that need data com-munications facilities for interconnection with their computer

We have some really tough data communications problems here in Canada," the vice-president of a time-sharing company said. "U.S. problems are relative-ly simple compared to what we are running into,"

Canadian communications pr lems stem in part from the fact that the interconnection of private communications systems is prohibited by Bell Canada.

In addition, customers are not permitted to use non-Bell multi-plexers or "data concentrators" on any data communications lines. And Bell itself cannot supply this equipment nor does it provide this type of service.

As an alternative, Bell Canada has offered Data-FX service to computer users. The Data-FX facilities are basically the inter-connection of multiple data channels between computer users' sites and Bell Canada central office switching centers, Users have charged that the phone company is providing the Data-FX service on a selective basis to some companies while flatly refusing the service to

One of the technical dif-ficulties of the data service is that no U.S. Bell System com-pany presently interconnects with Canadian Data-FX facili-

This aspect is especially crucial for Canadian data communica-tions users who want to interconnect their facilities with U.S.

In Canada, data commun tions facilities are both regulated and unregulated.

One of the unregulated sectors in which Bell sets its own rates is private wire communications lines. One user told CW that the ines. One user told CW that the monthly rate for a private line from Montreal to Teronto (about 300 miles) "comes to about \$1,000."

He added that similar facilities in the U.S. would cost a user about \$300 per month."

The Canadian government apparently has also become con-cerned about data communica-tions services. Recently. Com-munications Minister Eric

Data Users Excluded From Panel

WASHINGTON, D.C. - The initial meeting of a National Academy of Sciences study panel exploring technical aspects of telephone network interconnections was held here on

terconnections was held here on Sept. 25, Some 150 interested representatives of organizations affected by the inquiry attended, Announcement of those com-prising the 14-man panel brought several inquiries from the floor. Representatives of computer and manufacturers of the panel included two Bell Sytem of-ficials and no representatives of ials and no representatives of

Bell customer groups.

Billig replied that the panel had been chosen for its impartial technical competence and that a proper "mix" had been achieved. He added that con-

sideration would be given to including a representative of communications users on the panel, in this regard some sources felt that a representative from the Association of Data Processing Service Organizations (Adapso) would be added to

The NAS study panel was or-ganized at the request of the Federal Communications Commission to investigate technical aspects of interconnections to the telephone network. The study is expected to include both public and closed hearings, and the group should be ready to make its recommendations to the FCC early in 1970, accord-

ing to Billig.

In response to another question from those present, Billig said that the next meeting of the

but that announcements would be forthcoming.

Billig urged all interested parties to the study to submit position papers to the group and said that all technical aspects of the interconnection problem

The NAS study partel will supplement, a continuing FCC in-quiry into the factors affecting communications services provided by the Bell System.

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Viewpoint on Standards

Standardized Languages Offer No Benefits to Users

CW Software Editor -uage and interface stanof the standardization process, be obsolete when defined. New technology, software, and appli-cations change the basic ways in

which computers are used far faster than standards can be de-

The purpose of standardizing software should be to save users time and money in program dewelopment and conversion from guage. Such "freezing in con-one computer to another, crete" may do users more harm

Cobol is an example of the problem. When the USA-Stan-dards Institute finally approved a standard Cobol in 1968, the standard was based on a modi-fied 1965 version of the lan-

users to interact with a PDP-8 by

PDP-8/S, or PDP-8/I CPU
equipped with teletypewriter
terminals or any computer using
a standard Trac processor, Stone

The use of AAPL provides an

easy-to-use ilesk calculator capability for PDP-8 users, ac-

storage allocation; automati

infix vector operators, according

The implementation of AAPL
was accomplished in several
weeks with only about 30 lines
of coding, Stone said; after com-

AAPL details are available free

between Trac and APL

tions; generalized sums, ducts, etc.; and creation of

had been determined

They feel that in order to provide the services his manageent demands, the user n always attempt to take advantage of the latest developments in software.

reter Harris, president of Adpac Computing Languages Corp., contends that no free-format language can ever achieve proper standardization, since its basic purpose is to available. sic purpose is to provide a tool for people who are themselves unique and who have different ways of thinking about a prob-

lem they are trying to so lem they are trying to solve.

The entire concept of a programming language as a tool for
defining a data processing problem in human terms is alien to
standardization, Harris says.

But if the basic functions or capabilities of a language are to be standardized, then the actual appearance or syntax of a lanage can be anything the user

wishes.

The logic, once defined, can be converted into a standard format, such as that provided by decision tables, and then can be existed as a successful and any desired. capanity for PDFs ages, according to the company,
AAPL features include: arithmetic input; unlimited precision varying arithmetic base; dynamic storage allocation; automatic easily converted into any desi

Decision Table Problems

There already have been prob-lems with the efforts to stan-dardize some type of decision table specifications, but it would seem that this area should be far easier to standardize than, say, a Cobol compiler,

Decision tables also have the advantage of being understood upon surface examination, eliminating the need for detailed analysis of

Several companies already of-fer a preprocessor that will ac-cept input definitions for a pro-gram in the form of a series of decision tables and produce Cebol source code as output.

Additionally, compiler writers are using "table-driven" com-pilers to produce more efficient compilers and more efficient ob-ject code. These compilers build a decision table that describes the logical sequence of decisions within the operating environ ment and optimizes the code erated sequence.

Call for Standard

There is a definite, need for some form of standardization in the use of computers. It appears that limited types of standardization may provide tremend henefits for a

The area in which this enor-The area in which this enormous effort might be best applied, however, does not seem to be in computer languages or computer software. Instead it is in the definition of basic tools that can then be used to define any type of software or language any type of software or language in terms that can be understood by a "standard" interface and converted into whatever language is needed for a new computer or compiler.

It might become possible, with such techniques, to eliminate the compiler entirely as a user-oriented tool for production

The decision table can specify everything necessary to make a program work properly on any

APL-Derivative Language PDP-8s Developed at Western Electric Center

PRINCETON, N.J. - An 'ad-aptation of APL designed for use on small computers such as the Digital Equipment Corp. PDP-8 series has been developed by Richard Stone, staff member at

According to Stone, the adap-tation, called an additional pro-gramming language (AAPL), is actually a subset of the APL minal.

AAPL is used in conjunction with the Text Reckoning and Compiling (Trac) language, at

Two New SDC Centers To Serve Both Coasts

SANTA MONICA, Calif. -SANTA More System Development Corp. (SDC) has announced the open-ing of two SDC Datacenters of-fering data management services to business and industry on the East and West Coasts.

The eastern SDC Datacenter, lo-The eastern SDC Datacenter, to-cated in Falls Church, Va., will serve customers in the metro-politan area and the Dallas-Houston area. It operates an IBM 360/65 system.

SDC's western Datacenter, located in Santa Monica, Calif., will serve the greater Los Angeles metropolitan area and the Dallas-Houston area, It operates an IRM 360/67 system. ·Each SDC Datacenter will serve

Each SDC Datacenter will serve approximately 50 customers initially. Users from the New York and the Dallas-Houston areas will be tied in via leased-line multiplexers that involve only a local phone call from

The Datace commercial data management system. SDC says the system is a general-purpose data manage-ment system with full interactive capabilities operating in a timesharing mode

The system permits managers

knowledge of computer pro-gramming to access large data bases in a completely unstrucbases in a completely unstruc-tured, flexible manner, directly from remote terminals in their

The system receives and pro-cesses all requests in English-like phrases. The data base files can be easily maintained, updated, and expanded as the need arises. A mong other features, visual CRT display and report-generat-ing capabilities are available with

Datacenter services.

Compilers, Cobol and Fortran languages, and bibliographic text-retrieval capabilities are also

All information contained in enter's files is rigidly controlled to prevent access by un-authorized users, says SDC.

Datacenter services are availab for as low as \$100 a month. SDC can also provide training and consultation for the total use of the system, card punching ser-vices, and all tape and disk

Through SDC's Datacenter, both batch and time-sharing ser-vices will be available. Company offices are at 2500 Colorado Ave

'Score' Expanded to Include Multi-File Input Processing

NEW YORK - Multi-lile input with Atlantic Softwire Inc., has processing has been added to the been installed in over 50 installed in the confine in the second of the seco

With the addition of the multiwith the addition of the material ple input capability, the user can extract, sort, report, and re-format information from boin master and detail files.

The company says it based the design of the feature on sugges-tions from several Score users.

lates simple, nonprocedural statements into a fully documented Cobol program," said Edward Opengart, senior vice-presi-dent of PMI.

Score is available on the IBM 360 for DOS A and OS; RCA tions from several Score users. Spectra 70 Series; Honeywell
The Score system, developed 200 Series; Univac 1108; and
by PMI and marketed jointly Burroughs 85500.

Tymshare Plans Services for Canadians PALO ALTO, Calif.,- Canada will have access early next year

to the Tymshare computer Canadian service will be offered coast to coast by a new company, Tymshåre Canada, Ltd., a joint venture of EDP Data Centres, Ltd., a Canadian computing service company, and Tymshare, Inc. of Palo Alto, a U.S. time-sharing firm.

Tymshare Canada will offer service initially in Toronto in the first quarter of 1970, and subsequently in other large Cana

sequently in ours and dian cities.

EDP Data Centres, a public company listed on the Vancouver, B.C., exchange, was organized in 1965 as one of the first independent data processing companies in Canada.

It presently employs nearly 300 people in Vancouver, Toronto, and Montreal and will increase its staff to about 350 ver the next six months. Initially, EDP operated only as

a customer data center. Now the company provider other services such as consulting. systems support, equipment evaluation, commercial batch processing, data preparation,

agement, and personnel place-ment service in the data process-ing field. computer leasing, facilities man-

CalComp System **Grades Patterns** ANAHEIM, Calif, -- California computer Products Inc. is offer-

ing the apparel industry a turncomputerized pattern grading system.

The complete pattern-grading installation includes a CalComp plotting system, automatic curve follower, and CalComp software, operated with an IBM 1130 mouter.

The price tag for a typical system including preinstallation training of operating personnel is about \$100,000, excluding the IBM 1130 computer, which can be leased or purchased separately at the customer's option. The proprietary software is available in several lease plans starting at \$1,000 per month for

Once operating personnel are pretrained, the manufacturer can use the system commercially five days; after installation. "The length of the training period

depends upon the background and experience of the trainees," said James L. Pyle, assistant to the president. The company is located at 305 N. Muller Street Falm Offers Multi-

File Retrieval NEW YORK - A file manage ment, information retrieval, and report-generation system is available from Faim Information Services Inc.

Written for IBM 360/30 under DOS, the system has the follow ing features: multifile input and tput; variable record lengths; algebraic and logical operati multireport generation; flexible headings, subheadings, and detail and summary totaling capabili-ties; and data base flexibility to reside on card or tape on more than one device,

Modular design permits sep-arate purchase of only those portions of the system needed. The information retrieval module is priced at \$12,000; the Prices include installation plu

Pick your time.

If you don't need all those lines into your own in-house computer, choose from two plans of time-sharing as offered by Call-A-Computer. Single-unit terminal usage, or on-site concentrators which offer substantial cost reductions to large volume users of remote time-sharing. These exclusive on-site concentrators provide extra economy to users with ten or more terminals installed in any location.

In either plan, you still get the full capabilities of fourth generation hardware and software interacting for maximum advantage to the computer user. This interaction between control and main memories accounts for the tremendous increase in speed/volume/throughput in these machines. Software designed by Call-A-Computer to optimize the potentials of fourth generation hardware brings these advantages within the reach of everyone.



If it's a job which a computer could be doing better, now you can have a computer do it. Call-A-Computer timesharing gives you the opportunity for efficiency and effectiveness in creative computer usage.

Because the joint efforts of Standard and Call-A-Computer were so successful, you can purchase or lease a full-scale interactive time-sharing system, a more modest and lower cost system, or buy blocks of time in small quantities or big, economical chunks.

Got the picture? Take your time. For more information on Call-A-Computer capabilities, call one of the C-A-C representatives in the following cities.

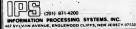
Standard Computer

1411 West Olympic Boulevard Los Angeles, California 90015 (213) 387-5267

Call-A-Computer:
Atlanta (404) 252-8116 - Baltimore (301) 792-0005 Birmingham (205) 871-9554 - Boston (617) 266-1930 Clincinnati (531) 421-8000 - Charlotte (704) 333-8305 Chicago (312) 445-2200 - Los Angeles (213) 722-1216 Louisville (502) 582-2205 - Minneapolis (612) 929-0471 New York (217) 288-910 - Phoenis (602) 268-8091 4 Tampa (813) 884-5293 - Washington, D.C. (301) 776-6855

1401, 1410, 1440 FOR SALE

IPS has several IBM 1400 series systems for sale or lease Included are a 1401 40K tape system and 80K CPU, 1401 4K and 8K card systems, 1401 8K to 16K tape systems, 1401's with 1311 discs. Inexpensive 1401 D-3 (tape-toprinter only) deliverable in 90 days. Three 7330 tapes ble separately to add tape capacity to 1410 or 1401. 1440's with BK to 16K core, 2 to 5 1311's. For price, very and detailed specifications, please write or call.



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dents *CW Financial Desk, 797 Washington Street, Newton, Mass. 02160

EDP Utilized for Locating Machinery

WASHINGTON, D.C. -WASHINGTON, D.C. –
MDNIS, a new nationwide computer-controlled inventory system service and Locator, a new
monthly publication for locating sed machinery and equipment,

is now in operation. When a manufacturer needs a used press or lathe or other equipment, his local participat-ing dealer can locate the exact equipment anywhere in the U.S. in a matter of minutes with one telephone call to the MDNIS computer, the company claims. Inventories from more than 250 participating dealers initi, ated the MDNIS system, the company says, MDNIS dealers

are encouraged to use the telephone, Telex, and TWX to transmit listing information and inventory inquiries 'to

M DNIS search and retrieval. All listing information is fed into the computer-controlled inventory through a Univac 1108 terminal in MDNIS offices at 1400 20th Street, N.W., Wash-

1400 20th Street, N.W. washington, D.C.

Vol. 1, No. 1, of MDN/S

Locator, the new monthly directory published from the comtory published from the com-puter-controlled inventory is being mailed to more than 50,000 buyers and dealers of used machinery and equipment,

used machinery and equipment, according to Ray J. Taylor, gen-eral manager of MDNIS. The 240-page issue contains more than 7,500 items.

A special computer program
was designed by Eli P.
Schneider, computer systems
consultant, and the computer speed time-sharing plan was arranged with Computer Response Corp. of Washington, D.C.

Time-Sharing Service Ready for Hospitals

CHICAGO - American Medical Computer Centers, a sub-sidiary of American Biomedical Corp., has opened a new com-puter center in Chicago and inaugurated a new computer time-sharing service for hospitals and

AMCC President John H. Anderson reported that the com-puter center already has con-tracts with three Chicago area hospitals and letters of intent from two others for services in the near future.

The computer center, located at Chicago O'Hare Aerospace Center, will use two Honeywell computers. A model 1200 is now installed, and a Model 125 will be added soon, he said.

Teletype input/output ter-minals are being installed in each hospital."

The remote terminals are online with AMCC's central com-

puter in Chicago. The system provides patient accounting and other accounting

and administrative services. Basic information is carried over tele phone lines to the central computer from the terminals. Patient statements and admin

istrative reports are then re-trieved by the terminal on de-mand and printed out in the hospital.

Sale/Leaseback Service Available in New York

NEW YORK - United Data Centers, Inc., a New York-based network of data centers, has inaugurated a sale/leaseback pro gram for the purchase of internal data processing departments from various business organiza-

tions. Bernard Goldstein, president, pointed out that the advantages of such an arrangement to a business organization are sub-stitutions of variable overhead for fixed overhead; the release of needed capital; the conversion of overhead cost to capital gain; and the release of manage committed. The company is lo cated at 575 Lexington Ave.

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DEC COMPUTER USERS

You can now, in many cases, automate your inventory, payroll or other reports for less than the cost of a file clerk with RPG (Report Program Generator) immediately available for PDP-8 PDP-9 PDP-10

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the computer industry's first data input system accepts the output from 60 or more

key stations simultaneously Time-shared input cuts data preparation costs 50%.

reach CONE 97%.

Now you can cut your computer input costs in half. This niew innovation in data breparation techniques gives you know micry-saving advantages over conventional keypunch or one keyboard (one majericit steeper; clipher LC 780 employs a computer time-shared input. (2) it is the only system available that provides data output directly on IBM 360-compatible magnetic disc.

patible magnetic disc by time-sharing the data from 60 or more keyboard operators simultaneously, significant savings in dala station costs of as much ses 50% can be achieved. Costs drop to as low as \$50% can be achieved. Costs drop to as low as \$430 per oats attain for a typical 80 station system. For large data preparation installations, the time-shared input is the only economical way to go.

Data entered into the LC-720 is processed by a small dunital computer and str

ormagnetic tape rees are eliminated. All data is conveniently and coronomically stored in an IBM 1316 disc pack for direct high speed input to your modern data processing system. Naturally, an IBM 360-compatible magnetic tape is also provided with the system as standard

The LC 720 KeyDisk System also offers for the starst time, data verification requiring one input pass only through the system, in adultion to the normal technique of verification requiring variable by each operator from 1 to 120 char-actirs long and the system stores a large library of 300 rimore different format cytop programs, all available simultaneously to any and all operators.







o (201) 334-3713





How a 36-year-old refrigerator helped John Middleton, Inc. choose a new computer



member old reliable — the eneral Electric monitor top

trina .

Herbert Middleton, Jr., fourth generation president of

generation president of Middleton Tobacco, remembers

Middleton Tobacco, remembers better than most, because he still has one. sing else in Middleton's factory is modern.

up to-date to produce finest quality smoking tobaccos. Someone was supposed to throw the refrigerator away. But it just wouldn't quit. It's still in service today as the bean for the last 36 years.

When he needed a new computer, Mr. Middletor went for the same kind of reliability and economy he's still getting from his refrigerator The result: a GE-55 computer

Raliability? The GE-55 was up and running (00 percent in less than two days from time of delivery. That was last January. Since then, downtime has been next to nothing. Another

service record in the making.
Economy? The GE 55 is the least expensive computer General Electric makes. But it has many capabilities of much larger, much

these values
If you're looking for a computer, any size
computer, call your nearest GE Information
Systems Office. Or write Section 290 53 E

Schenectady, N.Y. 1230 You can join the people like Herb Middletc who know progress means a lot mo

It also means getting the most out of th



Some of the most progressive people in the world choose GF computats

GENERAL 🍪 ELECTRIC

We're eager to show you our new operating system.

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Honeywell OS/200.

We'll match it against DOS/360 anytime.

Its throughput is better, with less overhead.

It executes up to 8 operations at the same time.

It provides concurrent real-time and multiple batch-job processing.

It can handle simulation, linear programming and many other Management Science packages.

It makes a programmer's life easier, with its modular programming capability and memory-location independence.

And it can run 'liberated' 1401, 1440, 1460 tape or disk programs and 360 RPG programs. It does this at native Series 200 speeds, and multiprograms them.

The new Honeywell OS/200 operating system.

Now it's your turn to be eager.

The Other Computer Company: **Honeywell**



societies

Can Computers Be Used To Solve Campus Crisis?

WASHINGTON, D.C. – Could computers be used to help find a solution to the social problems of campus confrontation and revoit? This is one of the things the American Society for Cybernetics will discuss during its October symposium, "Cybernetics in the Seventies and Conflict Resolution."

The society will discuss the possibilities of simulating cam-

Tel-Tech's MULTIPLEXER

First it pays for itself.

Then it really starts making you money!

The TTC-1000 is far shoad in technology and behind in price. You pay less for the TTC-1000 when you buy or lease it, less when you add channels much less for spare parts.

And because of its simplicity and integrity you plug it in end forget it. No adjustments

No adjustments
You can multiplex 2 to 38 chennels
into e single voice grade phone circuit
intermix data speeds eliminate
terminal disconnects connect to
sny terminal and choose from
a host of industry-first options If the TTC-1000 is so good, why isn't it'No 12 it is!



sus confrontation on a computer. Attenders will hear such speakers as Dr. Preston Valien, sciting associate U.S. commissioner for higher education; Dr. David P. Garden, Unaversity of California; Dr. Thomas C. Schelling, Harvad University, and Dr. Martin. Shobbi, Yale University, discuss the competent of the California of the Californi ons, the afternoon programs will consist, of co papers in the following areas of papers in the following areas of interest: medical and psycho-bio-logical cybernetics, technical ap-plications of theory of com-puters and automata, technical applications of information theory, and applications of cy-bernetic methods and tech-nology in humanities and social

Sponsored by the National Science Foundation and the National Bureau of Standards, the symposium will be held Oct. 14-16 in Gaithersburg, Md. All those who are interested All those who are interested may contact, Dr. Carl Hammer, Director of Scientific Marketing, Univac Division, Sperry Rand Corp., 2121 Wisconsin Ave.,

Corp., 2121 Wisconsin Ave., N.W., Washington, D.C. 20007.

Nerem Sessions to Focus on Proposals In Communication and Computer Growth

BOSTON - The Northeast Electronics Research and Engi-neering Meeting (Nerem) of IEEE, to be held here Nov. 5-7, will feature technical program sessions on advanced proposals and developments in communi-cations, transportation, and

or innovation at Nerem-A major innovation at Nerem-69 will be a preshow, paid semi-nar on "Desk Top Computers: Their Design, Application, and Usage." Sponsored by the Bos-ton section of the IEEE, this seminar will be held on Nov. 5.

Tampa Symposium **Views Simulation**

TAMPA, Fla. – January 14, 15, and 16 have been set aside as the dates for the 3rd Annual Simulation Symposium to be

simulation Symposium to be held in Tamps.
Organized by firms involved in the art of simulation, the symposium was designed for several report of the symposium was designed for several report of the forum for the cachange of working experiences in the field of digital computer simulation; to demonstrate the widest possible range of simulation; to demonstrate the widest possible range of simulation with first-hand exposure to methods; and to underwrite, through graint, the adventure, the product product of the art of simulation.

obtained by writing the Annual Simulation Symposium, P.O. Box 1155, Tampa, Fla. 33601.

nical program on small comput-ers and computer-instrument systems, will provide coverage of evolving computer technology. In addition, the meeting, slated to be held at the Sheraton Bos-

to be held at the Sheraton Boron Hotel and the War Memorial Auditorium, will broaden its system sessions to include the earth as well as the ocean sciences and will have special sessions on such evolving devices as monolithic memories and digital signal processing devices. It will also have five technical application seisions aimed at the operation of the properties of the services of the servic

ating and problem-solving level.

Apollo, the most noted technical undertaking in recent months, will also be thoroughly discussed. Chris Kraft, Nasa director of flight operations, will be the principal speaker at the Nerem banquet.

Nerem banquet.

A special post-flight seminar on

Nov. 7 will feature speakers

from Nasi's Houston Manned

Spacecraft Center and from

MiT's Instrumentation Laboratory, which developed the navigation and guidance control

systems.

imtwets calendar smewets

Oct. 13-14, Indianapolis, Ind. – The semiannual conference of the Midwestern Atlantic CFO Users Group, insurance users of IBM* 6.2 CFO package. Contact: F.M. Tuttle, Lincoln Liberty Life Insurance Co., Lincoln, Neb.

Oct. 20-21, Washington, D.C. - Systemation's seminar 'Systems Documentation Workshop," Contact: Tony Raitz, Systemation, Inc., P.O. Box 730, Colorado Springs, Colo.

Oct, 22-23, New York - A workshop seminar devoted to the role, use, and benefits of decision tables for data processing, offered by Artronic Information Systems, Ice, and Information Systems Leasing Corp. Contact: William L. Cioffi, Vico-President, Marketing, Artronic Information Systems Inc., New York, N.Y.

Oct, 23, Chicago – "How Top Management Can Manage the Computer," a workshop for executives, given by the Finance, Control, and Date Processing Group of A.T. Kearney & Co., Inc. Contact: Workshop Director, Executive Systems Workshop, A.T. Kearney & Co., Inc., 100 S. Wacker Drive, Chicago, Ill. 60606.

Oct. 27-31, New York - Business Equipment Manufacturers Association's (Bema) 11th Annual Business Equipment Expo-sition. Contact: Paul Notari, Bema, 235 E. 42nd St., New York, N.Y. 10017.

2 vital facts every top executive should know about computer time buying and selling.

Time Brokers, Inc. is the pioneer company in com-puter time marketing. Because of their long experience they can quickly arrange agreeable terms for time buyers and sellers. They know the computer time market be-ter than anyone. And no other specialist in marketing. excess computer time serves so many blue chip firms coast to coast

To help you keep up to date on computer time buying and selling. Time Brokers, Inc. publishes "Computer Time Report." This quarterly report gives you detailed information about computer time availability and prices. You can get it free every quarter by mailing th

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COMPUTER FOR SALE OR LEASE

1401 C6-16K w/4-729 md, 2 drives 1401 E6 w/2 1311 disk drives & 4-7330 tape drives. 1401 C3 4K,

1401 COMPUTERS WANTED

1401 Systems wanted now; or will purchase now back until you want to release your 1401 System.

360-30 FOR LEASE OR PURCHASE

SPECIAL ITEMS FOR SALE W/IBM M/A

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UNIT RECORD EQUIP. FOR SALE W/IBM M/A

026, 029 Keypunches 062, 063, 064, 065, 068 402, 403, 407, 514, 519, 552, 602

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Yes, Virginia there is a System 21

VIATRON SYSTEM 21



DATA COMMUNICATION

DATA Recording



The Inside Story

System 21 is Now
Delivery Schedule
The Everything Machine
System 21 Configurations
Configurator

Operator Controls Price List System Description The 2140 and 2150 Computers

VIATRON Computer Systems Corporation, Route 62, Bedford, Mass. 01730.

Advertising supplement to COMPUTERWORLD October 8, 1969

The Concept

System 21 is unique. You saw tha ads that introduced this low cost system to prepare, communication, multiput, pricess, relievely. As yestem that would greatly increase your data processing capabilities. A system that would put data processing within the reach of awary business. A system that wean't too expensive or too complax for people to use.

Mass production and delivery

System 21 components are now being mass pro-duced. Initial deliveries to customers have begun. The schadule for city-by-city expansion of deliveries is printed below.

You can rent or buy VIATRON System 21 data processing equipment for half, a third — a quarter of what you're presently paying for aquipment with similar capabilities.

To bring System 21 to businasses from coast-to-coast VIATRON is establishing a nationwida dealar organization that can provida on-the-spot local sarv-tce and systems support to averyona who neads data processing capabilities.

Sale and rental optic

Sale and renial options

Your Joole WATTON dealer can arrange delivery
your Joole WATTON dealer can arrange delivery
you are purchase
System 21 output, buy it on sime, rent it by the
month or met it and then buy it outright with a portion of your renials credited against purchase price.
You can determine the sale price of any System
2 configuration simply by multiplying the monthly
rental of the configuration by 48.

We have been supported to the plan that best
meets your needs — help you choose the service
plan that you require to go with it.

VIATRON uses the concept of replacement rather than repair service as the basis for normal maintenance. When we deliver aquipment to you there will be a local service depot to provide the kind of service you need.

Emergency Service

In addition to normal maintenance available at the depot, VIATRON will provide immediate on-site repair of replacement under the VIATRON Emergency Service Plan. You don't have to pay for service you don't need. Emergency service will be available 24hours a day

Initial Systam 21 dalivaries are schedulad in the following cities where customer support and service facilities are being astablished.



Wherever System 21 goes - immediate "On-Site" Service goes too

DELIVERY SCHEDULE

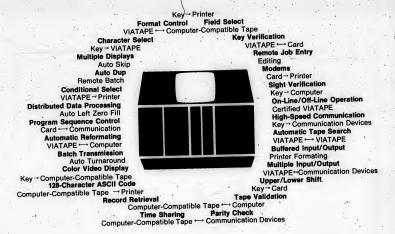
CITY	DATE
Akron	December 1969
Atlanta	February 1970
Baltimore	January 1970
Boston	September 196
Buffalo	February 1970
Chicago	November 1969
Cincinnati	January 1970
Claveland	Dacember 1969
Dallas	February 1970
Dayton -	January 1970
Danver	March 1970
Datroit	Novamber 196
Fort Worth	Fabruary 1970

9	Houston	
	Kansas City	,
	Los Angeles	
9	Miami .	F
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	Philadelphia	
9	Pittsburgh	,
	Rochester	ì
	St. Louis	
	San Francisco	п
9	Seattla	П
	Washington	,

CITY

DATE March 1970 March 1970 Decembar 1969 abruary 1970 March 1970 March 1970 October 1969 January 1970 January 1970 February 1970 February 1970 Decembar 1969 March 1970 January 1970 anuary 1970

The Everything machine!*



* The Everything Machine will handle most of your information management jobs — jobs that people had to do before. A complete family of machines being developed and manufactured now will perform all of the functions and individual operations listed above and many, many more.

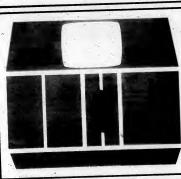


VIATAPE

System 21 Date Mevagement sistions use pocket sized confridges of megnatic tage citied VMTAE. The data says as the centrings holds nearly 50,000 miles tage citied VMTAE. The data says as the centrings holds nearly 50,000 miles to the confridence of confride

handling and reduces the chance of errors caused by ous, whether the tape.

Each entrieds comes with a protective tab to prevent accidental ensing or exerted controls comes with a protective table to prevent accidental ensing or exerted controls. Once the table is removed, the tape cannot be changed. But it of the controls are certified, lead to the table cannot be changed. But it is a control to the controls of the control of the controls of the control of the controls of the controls of the control of the control

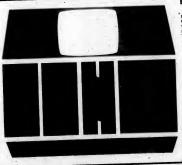


Basic Data Entry Terminal (\$39)

This configuration can be used in any source data entry application. Information is entered on the keyboard, visually verified on the video display, and recorded on NATAPE Cartridges.

The records can be displayed in such a way as a slow the operation enter variable data over the appropriate lixed headings and "fill in the blanks." The microprocessor is programmed so that the operations of skip, dupletels, neater drupters are fill, upput, and upper and lower white one performed automatically.

#1



Expanded Data Entry Terminal (\$55)

This configuration includes all the capabilities of Configuration ±1 plus additional promoters and provided the property of the capabilities of Configuration ±1 plus additional property to allow key verification, editing, auto-plus additional property to the capability of the capab

#2

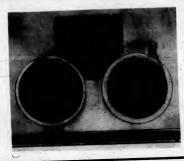
Computer-Compatible Tape

Computer-Compatible Tape
VIATRON's computer-compatible tape is designed to be even
more reliable insert and the second of the se

assurance.

The computer-compatible tape recorders will be available in 800-pg, 9-track, and 556/800 bpf, 7-track configurations.

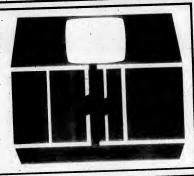
To give he same sophisticated tape support on your computer as we include in your LSI System 21 station togic. VIATRON supports are substituted to the support of the property of the prope



Basic Computer Tape Machine (\$95)

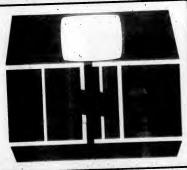
The addition of the Computer Compatible Tape Recorder to Configuration, at permits the operator to create computer-compatible tape directly with AFDE or the System 21 keyboard. Data is recorded or track (SSG and 800 bpi) or 9-track (800 bpi) tape:

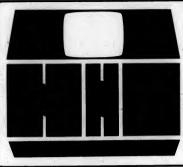
"This configuration also permits the user to make VIATAPES from computer-generated tape.



Expanded Computer Tape Machine (\$111)

This configuration includes the capabilities of Configurations #2 and 3, including the additional program capacity to allow key verification, automatic tape search, and editing with automatic reformatting.

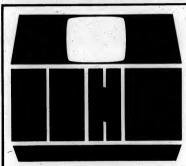




Batch Communications Configuration (\$78)

This configuration before the basic date entry operations of Configuration at and, in addition, permits the batch transmission or receipt of date, unstanded, to or from ACIG-compatible devices over a voice. The addition of the automatic multiple input feature to the Microprocessor allows automatic entry of date, and the automatic output capability of the 201 Microprocessor lollows output devices to the found that the date of the automatic output capability of the 201 Microprocessor to include multiple devices.

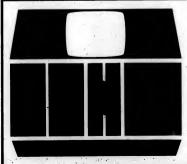




Multiple Input Output Communications Terminal With Formatted Hard Copy (\$97)

This configuration performs the data entry operations of Configuration in configuration and the state of the

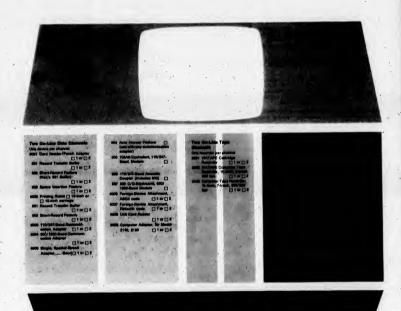
#6



Data Entry Unit With Printing and Card-Entry Capabilities (\$117)

This configuration is not made to the state of the copy — or the copy —

#7



How to configure individual System 21 Stations and Terminals

Sum of the parts

Data Channel Attachments

Two peripheral devices can be attached simultaneously to the data channels of the 2101 and 2111 microprocessors. These peripherals currently in-clude a System 21 Printing Robot, a Card Reader ciude a system 21 Printing Robot, a Card Reader Punch, a Communication Adapter and a Foreign Device Attachment. The system illustrated is equipped with a Printing Robot and a Communica-tion Adapter.

PRINTING ROBOT drives an IBM Selectric® type writer to provide formatted or unformatted hardcopy printout.

EXECUTE Switch. LIST mode provides 80-character listing of data records. "A" and "B" provide formatted output by interpreting control characters in the data record. These characters are carriage return, line feed, back space and tabulate.

Diode Pin Matrix allows selection of "tab begin" positions without requiring the use of control charactors within the data record

COMM DEVICE allows the transmission or receipt of standard ASCII characters over voice-grade lines operating in a half-duplex mode at speeds ranging up to 1200 bits per second. Panel switches allow: 1. Speed selection as dictated by the modern used. 2. Synchronization in transmission between System 21 terminals. 3. Attended or unattended operations

Card Reeder-Punch allows direct data transfer to and from an IBM 29 card punch. Data from the microprocessor can be punched on cards, or data on cards can be read into the microprocessor memory on a single-record or batch basis,

Mode Switch allows you to (1) read cards, (2) punch cards, or (3) disengage.

Record Length Switch. In the "short" position, this switch allows the release of a card when fewer than 80 characters are punched.

Foreign Device Attachment (Not illustrated)

Tape Channel Attachments

There are two channels to which VIATAPE and Computer Compatible Tape Recorders can be a tached. The system Illustrated has one of each VIATAPE Recorder reads and records 80-character records on VIATAPE.

1 RECORD/FAST Switches permit tape movement forward or backward. .

COMPUTER TAPE Recorder also has standard LOAD, RESET, REWIND and FILE GAP controls.

Keyboard -

Typewriter and keypunch keyboard with color coding characters.

- L-5 Position 1 (2111)* Moves the key entry cursor to position 1.
 - -4 Go (2111) Starts program execution after a programmed halt.
 - Delete (2111)
 - Removes the character at the cursor posi-tion and closes up the remaining characters in the same field (optional).
 - L-2 Field Select (2111)
 - Moves the key entry cursor to the first posi-tion of the field Indicated by one numeric key stroke following (optional).

 - L-1 Position Select (2111)

 Moves the key entry cursor to the numeric position indicated by two numeric key strokes following (optional).

ERROR - Releases a keyboard lock resulting from an error condition. INPUT — initiates input to the microprocessor from the device selected by the STATUS Input rotary

OUTPUT — Initiates output from the microprocessor to the device selected by the STATUS Output

rotary switch READY — Prepares the microprocessor for input from keyboard or any external device.

← (Back Space) - Back-spaces cursor one char-

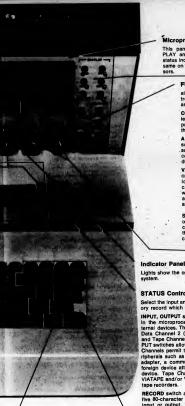
REPEAT - When this key and any other key held down, the other character is repeatedly tered into the microprocessor.

SHIFT UPPER - Selects characters shown. SHIFT X - Allows generation of standard A

communication control characters. BACK TAB — When in "Program Control", key moves the cursor back to the previous "F Begin" character. In "Manual Control" the cu

is moved to the first position of the record. CLEAR - Sets the microprocessor to initial





Microprocessor Control Panel -

This panel contains STATUS, FUNCTION, DIS-PLAY and OPTION controls and the processor status indicator panel. This panel is essentially the same on both the 2101 and the 2111 microproces-

FUNCTIONS Controls

allow the operator to call up control programs and initiate control and special functions.

CONTROL switch allows the seprograms stored by the user in he microprocessor

AUTO DUP/SKIP When this switch is "on", the microprocessor will automatically execute the control program instructions for duplication and skipping.

VALIDATE When "on", the mi- .. croprocessor automatically val-idates the contents of VIATAPE cartridges by performing a hard-ware "read-after-write" operation as each record is entered. (Available on 2111 microprocessor.)

SHORT REC When "on", rec-ords of less than 80 characters can be transmitted by generating the carriage return or line feed code (optional on the 2101/2111).

Lights show the operator the current status of the

STATUS Controls

Select the input and output channels and the mem-ory record which the operator wishes to use.

INPUT, OUTPUT switches. There are four channels in the microprocessor for the connection of ax-ternal devices. These are Data Channel 1 (DC 1), Data Channel 2 (DC 2), Tape Channel 1 (TC 1), and Tape Channel 2 (TC 2). The INPUT and OUT-PUT switches allow the selection of channels. Data Channels permit the attachment of System 21 peripherais such as a printing robot, a card read adapter, a communication adapter or, through a foreign device attachment, any ASCII or Hollerith device. Tape Channels allow the attachment of VIATAPE and/or VIATRON's computer-compatible

RECORD switch allows the selection of one of the five 80-character areas of memory to be used for input or output. These areas correspond to the READ, WRITE, MASTER and two CONTROL areas of the display.

R5 - Special function (on the 2101)

R-5 - Position 81 (2111)

Moves the key entry cursor off the screen to the right to prevent key entry.

R4 (Carriage return/line feed) — Generates ASCII carriage return or line feed character. R3 (Program Sequence Load) - Manual load of

one control record and associated master record from Tape Channel 1. (2101) R-3 - insert Inserts a space into the key entry record, at

the cursor position, moving characters to the right (2111).

DISPLAY Controls

The 3001 video subsystem dis-plays the contents of four of the five 80-character memory areas in the 2101/2111 microprocessor. Each memory area is divided into four lines of 20 characters. These areas are called READ, WRITE, MASTER and CONTROL.

READ, WRITE, MASTER and CONTROL switches control the display or suppression of the individual areas

FIFI D MKR allows the display of markers which locate the begin-ning of the data fields within the character area being entered.

FORMAT switch Interleaves the four lines of the MASTER area with the four lines of the WRITE area. The MASTER area usually functions as a form. This control lets the operator fill in the blanks on the interleaved WRITE area.

COLOR — In stations equipped with color displays, COLOR A allows the operator to select any of 8 colors. They may be used for either characters or background in any combination. COLOR B assigns 4 fixed colors to all (1) upper case, (2) lower case, (3) numeric and (4) communication control characters.

OPTIONS Control

Switches allow automatic input or output to or from selected channels.

INPUT A - Automatic Input from selected cha (optional on the 2101, standard on the

INPUT B - Automatic Input of one program and associated format from Tape Channel
1 (optional on the 2101/2111) INPUT C - Automatic input of two programs and

associated format from Tape Channel 1 (optional on the 2111)

OUTPUT A - Automatic output to selected channel. (standard on the 2101/2111)

OUTPUT B — Automatic output to Data Channel 1, then Tape Channel 2. (optional on the 2101/2111)

OUTPUT C — Automatic output to Data Channel 1, then Data Channel 2, (optional on the 2101/2111)

QUITPUT D Automatic output to Data Channel 1, then Data Channel 2, then Tape Channel 2. (optional on the 2101/

R2 (Duplication) - Duplicates characters from the READ record into the selected record.

R1 (Master Duplication) — Duplicates characters from the MASTER record into the selected record. OPTION ON/OFF - Turns selected input/output options on or off.

ERASE — Clears the memory area selected by the STATUS Record rotary switch.

CTRL1, CTRL2 - With Control On, allows the operator to shift to either of the two control programs residing in the microprocessor. When the record is completed, control reverts to the program selected by the FUNCTIONS Control Switch.

FRONT TAB — When in "Program Control", this key moves the cursor forward to the next "Field Begin" character. CTRL ON/OFF - Turns program control on or off.

CII

on-

SHIFT Y -- Allows generation of lower case alphabetic characters some of which are used to control color selection.

SHIFT LOWER - Selects characters shown.

→ (Advance) — Advances cursor one position.

price list

	٠.				Interleaving capability of Write and Master records (No charge for first Black & White Video Display when Feature 304 is				SPACE INSERTION leature In punch mode, adapter spaces over	\$3
MODEL F	EATUR	AFRESIPTION .	RENTAL		not ordered.)				an illegal character instead of punch- ing a question mark	
2101		MICHOPROCESSOR	\$20	302	RECORD SUPPRESS leature	\$2			my a question mark	
2101		512-word, Read-Only, Memory 400-charecter Read/Write Memory Two Tape Channels Automatic Skip Automatic Duplication Automatic Left Zero Fili Automatic Left Zero Fili	1200	- when	Permanent suppression of any com- bination of 80 character records on local or remote displays	-	6002		a For IRM Selectric® 13" or 15"	\$25
		Automatic Skip Automatic Duplication Automatic Left Zero Fili		303	SELECTED DATA DISPLAY leature • Allows selective distribution of data	\$4			Carriage Includes Format Control Printing speed of 12 cps Easily removed for normal typewriter	
		Shift Control . Automatic Output to selected data		. 1	to local or remote displays				 operation Automatic backepace, tab, carriage return, and index by code detection 	
		or tape channel .		304	COLOR VIDEO DISPLAY • Requires Selected Data Display fea-	\$26			Three print modes for straight line	
	101	AUTOMATIC MULTIPLE INPUT feature	.\$9						or formatted printing • Upper and lower case	
		 One record from Selected Channel or medium 			320-charecter display, divided into four 80-character records		-			
		One master and one control record from Tape Channel #1	i.	*	Suppression or display of any or all records Cursor in operational record Interleaving capability of Write and			601	RECORD TRANSFER BUFFER • 80-character buffer permitting simul-	\$18
	102	AUTOMATIC MULTIPLE OUTPUT feature	\$4		Master Records Control characters for 8 Data and 8 Background Colors				taneous microprocessor operation and printing robot operation	
		To Data Channel 1 and Tape . Channel 2					6003		communications aparter	\$11
		To Data Channels 1 and 2- To Data Channels 1 and 2- plus Tape Channel 2 feature	- 1	305	Connection for up to 12 RF displays. Displays may be VIATRON Displays.	\$2			247 BAUD • 103A2-Compatible • Asynchronous communication in	
	103	SHORT RECORD feature Automatic input or output of a	\$10	4-9	Connection for up to 12 RF displays. Displays may be VIATRON Displays (Feature Code 306) or any com- mercial television display Up to two RF Modulators may be connected to Microprocessor		2		haif-duplex mode 7-level, ASCII code, record synchro- nization, optional parity check, 15- second time out	
		record less than 80 characters								
2111		MICROPROCESSOR 1024-word, Read-Only Memory 400-character Read/Write Memory	\$38	KEYBOARI	BLACK & WHITE RF VIDEO DISPLAY				AUTOMATIC ANSWER feature	\$10
		Two Tape Channels			ude Parellel Data Channel at \$1/month)			605	MODEM 110-247 BAUD	\$10
		Two Tape Channels Automatic Skip Automatic Duplication Automatic Left Zero Fili		4001	KEYBOARD	\$6		606	ACOUSTIC COUPLER.	\$15
4		Automatic Upper and Lower Shift Automatic Output to selected data or tape channel			Standard typewriter characters Standard card punch characters Microprocessor control characters				Dets transmission up to 300 bps Includes modem	
			-		Communications Control characters		6004		COMMUNICATIONS ADAPTER • High/Low speed selection—600 and	\$11
		or tape channel Automatic Tape Search Automatic Tape Validation		4002	KEYBOARD	\$13			1200 BAUD 202 C/D-Compatible	
		Editing, Automatic Reformatting Key Verification		1	Standard typewriter characters Standard card purich characters Microprocessor control characters		-		Asynchronous communication in half-duplex mode 7-level, ASCII code, record synchro- nization, optional parity check, 15-	
	102	AUTOMATIC MULTIPLE OUTPUT	\$4		Microprocessor control characters Communications Control characters 40-character card reader				nization, optional parity check, 15- second time out	٠.
		To Data Channel 1 and Tape Channel 2 To Data Channels 1 and 2		4099	Microprocessor control characters	84		604	AUTOMATIC ANSWER feature	\$5
		 To Data Channels 1 and 2, plus Tape Channel 2 		TAPE REC			1	607	MODEM 800-1200 BAUD	\$20
	***	SHORT RECORD feature	\$10	IAPE HEC	VIATAPE CARTRIDGE RECORDER	\$4			COMMUNICATIONS ADAPTER	\$21
٠	103	Automatic input or output of a record less than 80 characters		- 1	Capstan-free tape recorder using magnetic tape cartridges 7-level ASCII code		6005		Single special speed up to 1200 RAUD	\$2
	104	AUTOMATIC MULTIPLE INPUT feature			Bit read/write rate of 1250 bps			4	103A2- or 202 C/D-Compatible Asynchronous communication in half-duplex mode	
		One master and one control record from Tape Channel 1 One master and two control records		5002	COMPUTER-COMPATIBLE TAPE RECORDER	\$60			half-duplex mode 7-level, ASCII code, record synchro- nization, optional parity check, 15- second time out	
		from Tape Channel 1			9-track, 800 bpl 6-inch minireels of computer-com					
	105	FIELD AND POSITION SELECT feature			 2200, cps synchronous read/write 		6006		• Allows the input and output of ASCII	\$10
		Direct Access to selected field o character position			Complete blocking capability				Allows the input and output of ASCII code foreign devices to the micro-processor Parallel transfers to and from foreign device	
2140		GENERAL PURPOSE COMPUTER* • CPU 4K words of core memory	\$99	5003	COMPUTER-COMPATIBLE TAPE RECORDER	\$60	l	•	device	
		16-bit words 8 input/Output channels for local or remote attachment of System 2:	,		 7-track, Selectable density 800 bp or 558 bpl 		6007		FOREIGN DEVICE ATTACHMENT	\$2
		remote attachment of System 2: Data Management Terminals • Wideband Communications channel • Software, Utility subroutines, Assembler, and MACRO languages			6-Inch minirels of computer-competible tape 200 cps synchronous read/writrate Complete blocking capability	•			Allows the Input and output of Hol- ierith code foreign devices to and from the microprocessor Parallel transfers to and from foreign device	
2150		GENERAL PURPOSE COMPUTER	\$199	DATA CH	ANNEL ATTACHMENTS :lude Serial Data Channel at \$1/month)		6006		UNIT CARD READER	\$2
		CPU — 8K words of core memory 16-bit words							Hollerith code	
		Hardware Multiply and Divide 24-input Output channels for locs or remote attachment of System 2 Data Management Terminals	1	6001	CARD PUNCH/READER ADAPTER Transmits any of the card punch standard 64 characters	\$37 8	6009		COMPUTER ADAPTER, Model 2140 & 2150	\$1
		Pare Minagerian Terminals		aminina e	went to COMPLITERY	VORLE	Oct	obe		

MONTHLY | MODEL FEATURE

System escription

MODEL 2101 - MICROPROCESSOR



The VIATRON Model 2101 is an LSI/MOS Microprocessor that provides the storege end control logic functions for the System 21. It pro-vides 512 12 bif words of Read-Only Memory (ROM), confaining a hard-wired microprogram that is the equivalent of e general purpose computer's softwere operating system. Each Instruc-tion occupies one word of ROM storage. Access to a ROM subroutine is initiated by the receipt of alphanumeric or control characters.

In addition to the ROM, the Microprocessor confains 400 cherecters of Read-Write Memory divided into five records of 80 characters each: Read Record, Write Record, Master Record, Control Record 1, and Control Record 2. Any of these records can be selected manually tor independent input or output. At any one time, the Read, Write, Master, and one of the Control Records may be displayed. Although these five record areas can be manipulated at the discretion of the user, their intended use in a date entry operation is as

Read Record - contains the prior data record that has been entered.

Write Record -- contains the data currently being entered. As the completed data is fransferred to en output device, it is automatically transferred to the Read Record.

Master Record - contains fixed information thef is to be duplicated into the data record being entered or format words which fell the operator what information to enter.

Control Records 1 and 2 - eech contains a program to automatically control duplice-tion, master duplication, skipping, left zero fill, upper end lower shift.

Manual or automatic operation of Microprocessor functions can be controlled from the keyboard and the control panel. In the manual mode, the operator initiates ell operations performed by the Microprocessor. In the progrem confrol mode, functions ere performed automatically by the Microprocessor.

The operator-controlled automatic output cape bilify outputs to a pre-selected device as soon as e data record has been completely entered. The user cen select one of the tape recorders or a peripheral device to receive automatically the contents of the record being outputted.

Specifications

- · Logic and storage for deta input/output
- . Read/Write memory capacity of 400 8-bit characters, divided into 5 independent 80-character areas: READ, WRITE, MASTER, CONTROL 1, and CONTROL 2 Records
- . Read-Only Memory (ROM) capecity of 512 12-bit words
- · Dimensions: 20" deep, 19" wide, 11" high
- · Power Requirements: 110 VAC, 60 HZ
- Ambient Temperature Range: 32° F (0° C) to 96° F (36° C)
- Maximum Relative Humidity: 98% * * *

The Model 2101 Microprocessor Control Panel provides the operator with the following control switches

- Four toggle switches permitting suppression or display of the READ, WRITE, MASTER, end CONTROL Records on the video display.
- · A toggle switch permitting suppression or display of field merkers during programmed
- A toggle switch permitting interleaving of the WRITE end MASTER Records for "fill-in-theblanks" data entry
- A toggle switch permitting selection of CON-TROL Record 1 or CONTROL Record 2.
- A toggle switch thet enables the Micro processor to perform automatic duplicetion and skip operations under program control.
- . Three STATUS rotery switches that provide selection of: Input Chennel
 - Output Chennel
 - Microprocessor Record to be processed

The Model 2101 Microprocessor indicator panel is divided into three sections, which provide the operator with the following control lights:

Operator Section

- . CONTROL ON lights when the operator turns on program, control by pressing the CONTROL ON/OFF key.
- . OPTIONS ON lights when the operator de presses the OPTIONS ON/OFF key
- . ERROR lights indicating an operator error.

Processor Section

· SHIFT UPPER light indicates that the Microprocessor is operating in the upper shift

- · SHIFT LOWER light indicates that the Micro processor is operating in the lower shift
- · CHANNEL ERROR light indicates that a parify error hes been detected on incoming date.
- · NOT READY light indicates that a status rofery switch has been reset. This light tells to register the new status selection(s).
- · CONTROL ON light indicates that the Micro processor is under control of the selected CONTROL program.
- · CONTROL ONE lights when the Microprocessor is operating under CONTROL Record 1, or displaying CONTROL Record 1.
- CONTROL TWO lights when the Micro-processor is operating under CONTROL Record 2, or displeying CONTROL Record 2.
- · BUSY lights whenever the Microprocessor Is performing en operation.

Tane Section

. ALERT lights for the VIATAPE recorders to indicate:

- the beginning or end of tape
- the fape is moving uncontrolled stop occurs
- the tane is broken
- there is no VIATAPE cartridge in the
- transport

Tape Channel Controls

The 1 RECORD toggle switch permits the operator to move the tape in either direction, one

The FAST toggle switch permits high speed movement of the tape in either direction.

Data Channel Controls

The controls for Date Channels 1 and 2 are defermined by the devices that the user wishes to attach to these channels. Devices include a card reader/punch, a printing robot, a communications adapter, e unit card reader, and a foreign device attachment.

Program Control Characters

The control programs in control records 1 and 2 utilize the following character codes for the functions indicated:

- U sets the keyboard in the upper shift posi-
- L sets the keyboard in the lower shift posi-
- D causes the Microprocessor to duplicate the field from the Read Record into the selected record

- M causes the Microprocessor to duplicate the field from the Master Record into the selected record
- S causes the Microprocessor to skip to the beginning of the next field
- Z provides for right justification of numeric fields by inserting landing zeros automatically

Field Continuation Characters

Two field continuation cherecters are used in a CONTROL record to aneble autometic keyboard shift control within a field. These includa:

- (desh Identifies a field continuation upper shift
- (period) Identifies a field continuation —
 lower shift

OPTIONAL FEATURES

Feature 101 - AUTOMATIC MULTIPLE INPUT

This feature permits the operator to select the fined source for autometic input to the Micro-processor. The first automatic option (A on the fined options) to the fined source for source which provides eucomatic input from the channel selected on the STATUS INPUT roots; watch, Lev. policy, provides automatic for the selected on the STATUS input roots; watch to fine the selected of the STATUS input roots; watch to read the selected of the selected for the selected for the selected for the selected form the selected for the selected form the selec

Feature 102 — AUTOMATIC MULTIPLE OUT-

This feature permits the operator to salect a combination of tape or deta channels for auto-matic output. The first autometic output (A on tha Output rotary switch) prov output to the chennel selected. The second eutomatic output (B on the rotary switch) pro vides automatic output to Dete Chen ved by an automatic output to Tepa Chennel 2. The third eutomatic output (C on the rotary switch) provides automatic output to Data Channel 1 followed by an automatic output to Data Channel 2. The fourth automatic output (D on the rotery switch) provides autometic output to Data Channel 1, followed by an automatic output to Deta Channel 2, follows by an automatic output to Tepe Channel 2. Automatic output A is standard in the 2101.

Automatic outputs B, C, and D are optionel.

Feature 103 - SHORT RECORD

This optional teaturn allows the user to input output a record that is test han 90 characters to any device that is lest han 90 characters to any device attached to a data channel. We have the second despite provides minimum transision time. The Microprocessor that is equipped with the Short face time feed symbol (proceding by user) to signify and or record. In a fund transmission when the Microprocessor details the carrier of the state of the second control of the second control

MODEL 2111 - MICROPROCESSOR



The 2111 Microprocessor contains a 1,024 word --- x
Reed Only Memory and incorporates all the cepaplittias of the 2101 Microprocessor, plus the additionel capabilities and optional teatures described

STANDARD FEATURES

Tape Validation

Tape validation is performed by a read-atterwrite check on the tape. As each record is
entered onto tape, the Microprocessor autometically rereads the tepe record and compares it to the same record still in the Microprocessor's memory. Detaction of errors is indicated to the operator to permit immediate
corrective ection.

Editing

Editing allows the user to insert or delete character(s) within a field. When e character is inserted or deleted, the field is expanded or contrected automatically.

Reformatting

With reformetting, the contents of data records which have been recorded on tepe mey be automaticelly rearranged as directed by the

Key Verification

In eddition to visual verification of data. Me Model 2111 Microprocessor others the super-key verification. In the verification, a the verification of the verificatio

Automatic Tape Search

Provides the user with a means of locating a particular record on tape. A compare field is keyed into the Microprocessor, and that teps is then searched automatically until a metch occurs. The eutomatic teps search is accomplished under program control.

Automatic input

Provides for eutometic input from the selected Date or Tape Channel.

OPTIONAL FEATURES

Feature 104 - AUTOMATIC MULTIPLE INPUT

Provides for (1) autometic loading of e new formet with its associated program record, or (2) autometic loading of a new formet with two associated program records. Programs and formets are elways loaded from Tape Channal

Feature 105 — FIELD AND POSITION SELECT Allows the operator to position the cursor by keying the appropriate field or cheracter position number.

VIDEO DISPLAYS



The video display is divided into four record drass, each consisting of four lines of twenty characters, for all off off characters per record. The video first off characters per record. The video first off characters per retor the READ record, the WRITE record, providing a total display of 320 characters. Two CONTROL records can be stored in the Microprocessor et one time, one of which cen be displeyed, information entered into the Microproessor is displayed in the record selected at the control panel.

Interleaving

An extremely useful capebility of the video displays to the little control of the control operperson to the interiested mode finates date enor ulmply a matter of filling in the blents. In the interiested mode, the first line of the MRTE Racord is followed by the first line of the MASTER Record, the second line of the WRTE Record is followed by the stacend line of the MASTER Record, and so forth. This mode of operation permits the operator to enter veriable deta over tued headings that have been entered previously into the MASTER Record.

Field Marker and Curson

A beginning-of-field marker eppears under the first character in eech field as a guide for the operator. The field marker appear only under progrem control and only in the record in which the operator is currently working. The curror is a single-character underline which eppears in a record under the character position to be filled in next.

MODEL 3001 - VIDEO DISPLAY SUBSYSTEM



The video display subsystem allows the attachment of several feetures to the Microprocessor. Displey cherecters ere generated on a 5 x 7 dot metrix, and refreshed at the rete of 60 cycles per

FEATURE 301 - BLACK AND WHITE VIDEO DISPLAY

Nine-inch-diegonal display for use with com-posite video, that is, non-RF display chennels.

FEATURE 302 - RECORD SUPPRESS

Allows permanent suppression of any combina-tion of the four display records, as specified by the customer. Records cen be suppressed on either local or remote displays

FEATURE 303 - SELECTED DATA DISPLAY

Allows distribution of selected data to different displays through the use of color coding. Dete those terminels connected to outputs responding

FEATURE 304 - COLOR VIDEO DISPLAY

to the specific codes.

Twelve-Inch-diegonel color display for use with composite video. Up to 8 character colors and 8 background colors can be displeyed by inserting color control cheracters. Two color modes w the operator to color-code by charecter or

FEATURE 305 - BLACK AND WHITE RF MODULATOR

The RF moduletor ellows the connection of VIATRON RF displays (Feature Code 306), or commercial TV sets to the Microprocessor. One 75 ohm distribution trensformer is required for each four sets attached to the RF moduletor. Each commercial set requires a 75 ohm to 300 ohm metching trensformer. Commercial sets should be tuned to Chennel 3. The Microprocessor mey have up to two RF moduletors, and up to 12 displays may be used with eech one.

FEATURE 306 - BLACK AND WHITE BE VIDEO DISPLAY

Bleck end white displey for use with RF modu letor output channels

MODEL 4001 - KEYBOARD 5



The Model 4001 Keyboard has e total of 73 keys. It is the source of manuel deta input to System 21, and can control the operations of the Microprocessor. The keyboard incorporates the feetures of both a cerd punch and a stendard typewriter keyboard.

Specifications

- Number of Keys
- · Data Cheracter Set
- 73 (data and function) 128 cherecters, ASCII
- Code 52 alphabetic
- 10 numeric
- 33 communication
- contro
- 33 special

71/2" deep, 19" wide, 41/2" high

5001 - VIATAPE CARTRIDGE RECORDER



System 21 mey heve two Model 5001 VIATAPE Recorders connected to the microprocessor by meens of two tepe channels. They are used to record deta from the microprocessor and to read previously recorded dete into the microprocessor. ge medium for each VIATAPE R is e VIATAPE Certridge. This cartridge contains 300 feet of .15 inch certified magnetic tape end stores up to 50,000 elphenumeric cherecters.

The VIATAPE Recorder Control logic provides for redundent cherecter recording and eutometicelly corrects errors ceused by drop-out bits. This logic provides extremely relieble recording on the VIATAPE Certridge.

Specifications

- · Input Code
- · Bit Reed/Write Rete . Cherecter Read/
- Write Rete
- Read/Write Speed
 Stert Time
- Stert Distence · Stop Time
- Stop Distence
- . Time to Reed/Write e Record
- Time to Reed/Write a Tap
- . Time to Fast
- Forward Tepe · Time to Fest
- Reverse Tape Fast Forwerd Rete
- . Fast Reverse Rate
- 9.6 minutes

7-level ASCII

1 250 bits/second

109 cheracters/second

6.25 Inches/second

80 milliseconds

14 inch

1/e Inch

9 second

72 seconds meximu 72 seconds maximum 50 Inches/second

MODELS 5002 & 5003 - COMPUTER COMPATIBLE TAPE RECORDERS



The computer competible tepe recorder oper-ates on-line to Model 2101 and 2111 microprocessors. They are reed and write recorders that generate 7 or 9 track computer compatible tape at 556 or 800 bpl, and interface with the microprocessor through a tape channel.

- . 20" deep, 18" wide 19" high • Size:....
- Power Requirement: 250 watts Reel Diameter:.....6

de,	7 Track Model 5002	9 Track Model 5003
Interrecord Gep:	34"	1/2"
Character Set:	64c ASCII	128c ASCII

- . Tape Speed Read/Write 2.75"/sec 2.75"/sec Speed: Read/Write Rate: 2200c/sec 2200c/eec 44"/sec Speed: 44"/sec
- 80 charecters 80 characters · Record Size: Validation Multiple read Multiple read Procedure ofter write checking

checking

CONTROLS

Tape Transport Controls

. Power ON/OFF switch

Microprocessor Controls

- . . Load -- the load switch moves the tape forward and helts at the beginning-of-tape marker. . Rewind - the rewind switch rewinds the
- tepe end halts et the beginning-of-tepe marker, . One Record - the one record switch move
- the tepe forward or beckwerd one record. . Fest Forward/Fast Reverse - this switch
- continuously moves the tape until released. . . File Gap — the File Gap switch generates a stendard file gep, file mark character, and LRC

The tepe channel indicetors on the micro-processor control panel ere used by the com-puter competible tape recorder.

MODEL 6001 - CARD READER/ PUNCH ADAPTER



The Model 6001 Card Reader/Punch Adapter provides a direct connection between an IBM 29 card punch and the System 21 microprocessor. Reed mode — In the Read mode Information is reed from a punched card by the 29 card punch end trensmitted to the microprocessor.

Punch Moda — In the Punch mode an 80 character record is outputted from the System 21 microprocessor and is punched on a card in approximately 4.5 seconds.

RECORD - this switch salects SHORT or

NORMAL record length.

DISFNGAGE, READ, PUNCH — this three position switch in the DISENGAGE position permits the 29 cardpunch to operate independently of the System 21 microprocessor. In the READ position, the System 21 reeds from cerds in the 29 cardpunch, in the PUNCH position the System 21 microprocessor trensmits records to the 29 cerdnunch

FEATURE 601 - RECORD TRANSFER BUFFER

Permits simultaneous use of the microprocas-ser during tha 4.5-second cerdpunch cycle.

FEATURE 602 - SHORT RECORD

With a fixed length short record, the program card on the cardpunch allows the card to be released as soon as the punching operation is

FFATURE 603 - SPACE INSERTION

In the Punch mode, if a character other than one of the standard 64 characters is received from the microprocessor, a question mark will be punched on the card. If the space option is installed, the adapter will leave a spece on the card instead of punching a question merk. This allows the operator to correct the error instead of hav-

Specifications

••			 				
٠	Input	Medium	 Standard	12	row,	80	col-
			umn card				

· Quantity of Data 80 characters par card

 Charecter Set Standerd 64 character
 Hollerith set. This includes upper case latters, numerics and spe-

· Input SpeedThis is a function of the keypunch model.

Output to IBM Cardpunch

•	· Card type and size	Standard	12	row	80	col			
					umn card	8			

Card Code Standard Hollerith code

· Read at Punching Speed 20 characters (columns) per second (for non print-ing models); or 18 characters (columns) per sec-

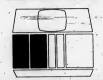
. Format Control Format controlled by Mi-

 Program Card Yes, (used for short rec-Control ord control)

and (printing models).

Standard Cable

MODEL 6002 PRINTING ROBOT



The VIATRON Model 6002 Printing Robot is a solenoid operated device which rests on the top of e stendard IBM Selectric typewriter. The Robot mechanically operates the typewriter keys upon the receipt of cheracter codes from the microprocessor. It prints et the rate of 12 cherecters per second. When not in use, the robot can be aasily removed from the Selectric kayboard.

Normal typewriter control functions, such as backspace, tabulation, carriage return, index and backspace, tabulation, carriage return, moex and shift may be automatically salected by code de-tection in the date stream when using the robot in the formatted moda. Tabulating commends can also be scheduled automatically by a tabulating

When in the list or unformatted mode, the robot accepts asynchronous data entry, up to twelve characters per second, end prints a deta line of eighty cherecters or less, depending upon the racord size. An autometic line feed/carriega return cycle is initieted after each line is printed.

When the robot is in the execute or formet mode, the control characters are recognized, thereby permitting variable line lengths which cen exceed 80 character positions.

Execute A mode is restricted to the 64 chara ers which appear on the black end white VIA-TRON Video display.

Execute B mode permits the typing of both Upper end Lower case characters, as displeyed on the color video display.

Through the simulteneous use of the euto/input end euto/output modes of operation in the microprocessor, it is possible to list, end formet, automatically, the antire contents of a VIATAPE car-tridge on e Robot Printer,

Specifications

Output medium	friction-fed or pin-fed
	roll paper or fenfold
	forms.
	The Model 6002 Print-
	ing Robot can be sup-
	plied to fit either 13" or
	15" Carriage Selectric
	typewriter.
Cheractar set	.88 printeble characters.
Reted printing speed: .	. 12 charecters/second.
Dimensions:	. 4" deep, 13" wide,
	31/2" high
Weight:	.7 pounds
	6 (stendard VIATRON cable)

CONTROLS AND OPERATION

Whan the Printing Robot is attached to the type-writer, the operator has access to the Tab Clear-Sat switch, and POWER ON/Off switches and

both margin releases of the typawriter. In addiinstalled on the top of the robot housing to allow an operator to preset the typewriter without re-movel of the robot. These controls are:

CARRIAGE RETURN BACKSPACE FORWARD SPACE

INDEX OPTIONAL FEATURES

601 Feeture - Record Transfer Buffer Allows simulteneous keyboard, tepe, or date chennel entry during the typing cycle.

Character Font

Printout from the stenderd IBM Courier 72 is

sufficient for most applications.
Howavar, a custom VIATRON Printing Robot type element (correspondence font) is being manufactured by IBM for VIATRON end will be available directly from VIATRON dealers.

MODELS 6003, 6004, AND 6005 — COMMUNICATIONS ADAPTERS



The Communications Adepters provide e stand ard EIA RS-232-A interface.et a microprocessor dete chennel. Communications ere controlled esynchronously in the helf-duplex mode

Model 6003 - Operetas at either 110 or 247.5 beud. It will drive a VIATRON 805 or eny other 103A2 com-

patible modem. Model 6004 - Operetes at either 600 or 1200

baud. It will drive a VIATRON 607 or eny other 202 C/D competible modem. Model 6005 - Operetes et eny custo

ifled speed up to 1200 beud. To 300 beud, the 8005 will drive a 103A2 compatible modem. From 300 to 1200 baud, the 6005 operates with a 202 C/D compatible modern.

In ell three models, a 7-level, 11-unit USASCII transmission code is used. Even parity is transmitted in the eighth bit position of each character. With the perity option, incoming cheracters are checked for evan parity. It an error is detected the CHANNEL ERROR indicator is lighted on the control panel and a question mark is sent to the processor for thet character,

CONTROLS AND OPERATIONS

The three Communications Adapters provide three stendard controls evallable to the System 21 operator at all times. These controls ere mounted on the front panel of the microprocessor end each consists of a two position toggle switch. The controis are:

SPEED SELECTION — Determines whether the high or low signalling speed (Baud rate) will be used.

ACKNOWLEDGE - With this switch in the ON position and with one VIATRON SYSTEM 21 talking to another, the receiving VIATRON station will send a return pulse to the transmitting station et the end of each record to acknowledge receipt end indicate that another record can now be trensmitted.

ATTENDED — UNATTENDED — When the switch is in the UNATTENDED position, Feature 604 eliminates the need for an operator to answer or terminete cells. It elso provides auto-matic time out to disconnect the modern if a carrier does not arrive efter a call is first initieted

MODEL 6006 & 6007 — FOREIGN DEVICE ATTACHMENT



The Foreign Device attachment buffers a microprocessor deta chennel to permit the attachment (through appropriate external control electronics) of foreign peripherel devices such as peper tape readers, punches, line printers. etc.

Model 8006 eccepts ASCII-coded data; Model 6007 accepts Hollerith-coded deta; both ere bi-directional, and both convert the incoming parallel date stream to seriel date for the SYSTEM 21

Specifications

· Charecter Set

Speed

- . Environmentel Requirements: Same as micro-
- processor · Power requirement: Power supplied by micro-
- · Foreign device signal requirements: the customer's equipment must be able to drive a 24 volt coll with e minimum impedance of 2800 ohms.

Model 6006 Model 6007

128 Charac- 64 Cherecter ASCII ter Hollerith Max Transmission

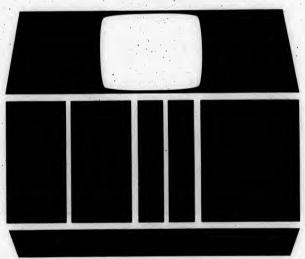
100 charac- 100 cherecters/sec ters/sec

UNIT CARD READER - MODEL 6008



The Model 6009 Unit Card Reeder reads data from en 80-column Hollerith coded cerd into the microprocessor. Cards are menually loaded and fed, one card at a time. The Card Reader is designed for epplications where some or all of the input date for a transaction has previously been captured in card form. The Unit Card Reader is connected to the microprocessor through a dete

- · Environmental Requirements: Same as Microprocessor
- · Power Requirement: Power supplied by Micro-
- . Max distance from Microprocessor: 6 feet · Charecter set: 64 character Hollerith
- Read sequence: Column by column (character by character)



Howabout a month com

Announcing: VIATRON'S First Two General-Purpose Computers: Planned For Delivery In the Spring of 1970

8 System 21 Terminals will be seally attached to the Model 2140 computer —24 to the 2150 — to give you Remote Batch, Time Sharing, Communication Control, Check-digit Verification, Batch Totaling, Fleid Editing, and me

The VARRON Model 2140 or 2150 can serve as concentrators to pool data from System 21 Terminals for high-speed transmission to other System 21 or foreign computers. A wideband channel will allow for data rates up to 100,000 words per second.

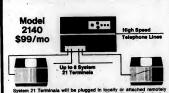
FOR EVERYONE WHO NEEDS A GENERAL-PURPOSE COMPUTER BUT THOUGHT HE COULDN'T AFFORD ONE Data Processing Centers / Small Businesses / Banks / Scientists / Remote Factories /

THE MODEL 2140 \$99 a month

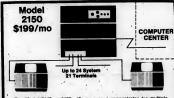
- LSI/MOS.CPU
 4K, 16-bit-Word Core Memory
- 48, 16-bit-Word Core Memory
 3 Index Registers
 5 Input/Output Channels for
 Local and Remote System 21 Terminals
 1 Wideband Input/Output Channel
 Full Control Panel
 Assembler and Macro Languages
 Utility Subroutines

- THE MODEL 2150 \$199 a month
 LSI/MOS CPU
 BK, 16-bit-Word Core Memory

- 8K, 18-bit-Word Core Memory
 3 Index Registers
 Hardware Multiply and Divide
 24 Input/Output Channels for
 Local and Remote System 21 Terminals
 1 Wideband Input/Output Channel
 Full Control Panel
 Assembler and Macro Languages
 Fortran Compiler
 (Utility Subrotutine)



inala will be plugged in locally or attached ren one lines to allow Data Entry Centers, Purch orms, or Billing locations to time-share the ge-ter capability of the Model 2140 or 2150.



The Model 2140 or 2150 will serve as a concentrator for multip System 21 Terminala to transmit batch jobs or inquiries and respons-between remote locationa and a large computer center.





education

Programmer Leaves State, **Commutes' Via Teletype**

EVANSVILLE, Ind. - Unlike the airline stewardes, women in doe't stop at women with the computer flead may not have shoot-age children mucht when they marry and marries a family. In an industry facing a chronic roop rammer a host tage, new content installations are score. the airline stewardess, women in the computer field may not have to go into premature "retirement" when they marry and raise a family. In an industry facing a chronic

in an industry facing a chronic programmer shortage, new sources of personnel deserve careful consideration. One novel approach for tapping the "pro-grammer pool" is being tried by

Last year, Mrs. Thomas Hooge-boom was a programmer in GE's Schenectady, N.Y., computer center. She had been at her job since 1965. When her husband was transferred to GE's Mt. Vernon, Ind., facility, Mrs. Hoogeboom took her job with her rather than quit. She is still programming for GE in Schenectady — via a Teletype terminal in her home. Each week Last year, Mrs. Thomas Ho

ninal in her home. Each w she receives data and .materi she receives data and materials from the company by mail. With her Teletype, she can use GE'S Schenectady computer and send the finished program back to

Mrs. Hoogeboom now works a total of about 20 hours per week. But possibilities for this.

EDP Internship Program Renewed

COBLESKILL, N.Y. - Teaching internships in data proce established at the two-year ing internships in data processing; established at the two-year State University of New York Agricultural and Tochicial College last year, have been continued in the 1969-70 academic year. The project is funded under the Vocational Education Act for \$29,600.

\$29,600.

The program is designed to provide teaching and technical experience for candidates completing a bachelor or masters degree in business, mathematics, or a related field, according to College President Walton A. Brown.

period, the intern gains teaching experience in a subject area compatible with his background and advances his computer language proficing the appointment, he also observes and assists an experienced data processing instructor while taking a cessing courses.

Three interns completed the program last year. All are now teaching data processing in two-year colleges, two of them at

The program is open to both men and women. Interns receive \$600 per month while affiliated with the program.

that keep them from commuting to a job; and for people with limited time to devote to a job,

NEW YORK - Five of seven weekly presentations featuring pioneers in the use of computers in the creative and performing arts remain to be presented at the New School for Social Re-

the New School for Social Re-search in New York City.

The programa, part of a non-credit series entitled "Computers and the Arts," are held each Thursday at 8 p.m. and may be attended without prior registraton for \$3.50 each

tion for \$3,50 each.
Programs remaining include:

"Computer Generated Filma
in Education: Instant Insight?"
by filmmakers Bruce and Katherine Cornwell on Oct. 16

 "Programmed Literature and the Computer," conducted by poet Emmett Williams and Peter Neumann, a computer scientist, on Oct. 23 . "October 30th," with poet

N.Y. Series Combines Arts, Computers and artist Jackson Mac Low, on

and artist Jacobs and that date

"An Approach to Musical Composition With a Computer," featuring James Tenney, composer, planist, and conductor, on

"Computer Music - Com-

posing, Playing, and Appreciat-ing," by Max Matthewa, among the first to use the computer as a

For further information, contact the registrar's office, The New School, 66 W. 12th St., New York, N.Y.

Interdata Gives Model 4 to College

WEST LONG BRANCH, N.J.— A \$14,000 Model 4 com-puter has been donated to Mon-mouth College by Interdata, Inc., Oceanport, N.J., for use by the department of electronic engineering and for student and faculty research projects.

Arrangements for the gift, a general-purpose digital proces-sor, were made when Interdata President Daniel Sinnott learned

of Dr. Harold Drucker's interest in obtaining a computer to do pattern-recognition experiments. Drucker, an assistant professor of electronic engineering, is par-ticularly interested in computer recognition of human speech

patterns.

An interdata spokesman said that the firm haano current plana for similar grants, but that requests might be considered from quests might be considered to time to time on a need basis.

Instead of a faster computer, why doesn't somebody develop a faster programmer?



Announcing the next best thing: Data Check Express, the first generalized proprietary system designed to save valuable programmer time now consumed by data editing.

The Hidden Bottleneck. One of the first things you learned about computers was "GI-GO." Garbage in equals garbage out. And

that's why data editing is so

The front end of every job is the great data-editing bottleneck: time is needed for coding, compiling, debugging and testing a custom editing program. It's a hidden bottleneck because costs for editing are hidden on your time sheets in all phases-problem definition, coding, testing, and (all too often) re-running an entire job fouled by bad data Our best estimate is that about

20% of every programmer's time is now used up on data editing. Valuable programming time that could be used to get new jobs in the works...

If there was an alternate to present
data editing methods.

The Alternate. generalized proprietary software program for data editing. It performs checking, validation based on complex relationships, error correction, file restructuring and file updating, DATA CHECK EXPRESS can free your programmers for more productive work by (1) eliminating the

need for original programming edit new data; (2) getting new jobs started faster (an editing program started taster (an editing program normally written in 20 pages can be cut to 3 coding sheets which cuts debugging and testing time as well as coding time); (3) allowing junior programmers to perform the editing function: (4) providing a standardized self-documenting procedure (instead of each programmer doing things

Why didn't somebody think of this before?

Probably because there hasn't bee company like Express Software Systems before. We're a three-yea old software company that believes high quality proprietary programs provide the best answer to your rising programming costs and the shortage of skilled programmers. And we live by our belief, We concentrate all our efforts in developing and

all our entors in developing and marketing proprietary software. Looks like we're on the right track, too, DATA CHECK EXPRESS, our second baby, was released just a few months ago and it has already been installed at several national

organizations. Our firstborn, EXPRESS III, a

general purpose tabulation and ummary reporting system, is also doing very nicely, thank you, at

DATA CHECK EXPRESS (and EXPRESS III, for that matter) is fully tesfed and ready to install. Tomorrow afternoon if you'd like. At the same time we'll teach your people how to use DATA CHECK EXPRESS. (There are only 20 or so com to master, so even junior programmers can become expert in about 2 hours.) By next Tuesday. your programmers could be churning more information out of that computer of yours with fasier turnaround.

DATA CHECK EXPRESS machine needs are IBM 360/30 and up, OS or DOS, RCA Spectra 70 or any equivalent computer

Fine. But how much?

If you go along with our estimate that data editing now uses up about 20% of every programmer's time, then DATA CHECK EXPRESS is one of the biggest bargains in town. The one-time cost equals about one-half of what you now pay one programmer

for one year. sted? Get more details by attending one of our seminars or by having one of our people call on you. Write, wire or phone us.



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New Literature

Dimensions, Bustrations, and descriptions of Tab Products Co.'s various tab room equipment and inodular storage products for magnetic tape, disk packs, program binders and printouts are available. Write for Data Sheet #476, Tab Products Co., 2690 Hanower St., Palo Alto, Calif. 94304.

Preventine Maintenance, a our-page case study of the ap-dication of a new system of utomated filing and informa-

45229.

45229.
A versatile digital/frequencyshift keying modem that oparates in three modes is described in a new product bulletin. Write for Bulletin 7260
from Tele-Dynamics, Division of
Ambac Industries, Inc., 5000
Parkside Ave., Philadelphia, Pa.
10.11.

Bulletin GEA-8838 from GE

describes tha GE-Fac 30 mile computer series. The publication describes equipment that as ploys integrated circuits in re-time applications; offers a chol-of standard or custom rea-

of standard or custom read-only memories; uses plug-in modules for field modification or expansion; and has 16- or 32-bit instructions. Contact the GE Process Computer Dept., 2255 W. Desert Cove Road, Phoenix, Ariz. 85029.

Applied Logic Corp. has issued

a five-page bulletin describing their electronic circuit analysis program (Ecap). The program is available to users over the Al/ Com network, Write the Marketing Service Library, Applied Logic Corp., 1 Palmar Sq., Princeton, N.J. 08540.

Princeton, N.J. 06340.

A recently published four-page brochure describing the bidirectional counters and display systems manufactured by the Wayne-George Division of Itek Corp. may be obtained by writing tha division's Dept. 530, Christina St., Newton. Mais. 02161.

Cogo-10, a civil engineering lan-guage offared over the Al/Com network, is described in a bul letin available from the advertis-ing department of Applied Logic Corp., 1 Palmer So. Princeton ing department of Apptied Logic Corp., t Palmer Sq., Princeton, N.J. 08540. Cogo-10 is the time-sharing version of Cogo-90 and is fully compatible with it. A 61-page reference manual for \$3.00 is also available.

A brochure describing systams massurement software, SMS/360, may be obtained by writing: Boole & Babbage, Inc., 1121 San Autonio Road, Palo Alto, Calif. 94303.

Presentations from the interna-tional Seminar on Automated Publishing Systems held in Sep-tember in England are summarized in a 120-page book en-titled. Automated Publishing

titled, Automated Publishing Systems. The book deals with many sapects of advanced typesetting technology, ranging from com-puter-oriented editing to high-speed photocomposition output; but emphasis is on the basic design and economic implica-tions of total systems. Copies may be obtained for \$5.00, pre-nied from the Director. Com-nied from the Director. Commay be obtained for \$3.00, pre-paid, from the Director, Com-position Information Services, Inc., 1605 Cahuenga Blvd., Los Angeles, Calif. 90038.

A booklet entitled A Sys-tematic Guide to Tape Mainten-ance Problems and Corrective Programs 1s available from Richard Munn, Kybe Corp., 132

Calvary St., Waltham, 02154.

the recent Georgia-Reliand the recent Georgia-Reliance Symposium on Automation and Society are included in a 16-page booklet available from Prof. Ellis L. Scott, College of Business Administration, Univ. of Georgia, Athans, Ga. 30601.

Georgia, Athans, Ga. 20601.

An eightoge, litterated brother describing the GE 400 to-formation system application software is evaluable. Hemanovered include the sattomatical by programmed tools (Apr. 111). (GMD) programm, a civil engineering peckage, electric utility engineering program, a formation of the control of t

The Universal network control processor (NCP) modular com-munications front end for third-generation computers is de-scribed in a brochure from Uniscribed in a brochure from Universal Systems. The system directs data interchange between remote terminals and a large-scale central computer. Details are available by writing: Marketing Department, Universal Systems, Inc., 4733 Bethesda Ave., Washington, D.C. 20014.

Washington, D.C., 20014.
Information and Data Processing Systems is the title of a 12-page, flustrated builctin detailing 15 products of Backman ments division. Included are the Model 3700 Amean subsystem, the Model 3710 universal output output, and the Model 816 digitation of the

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James L. Ward Executive Vice President COMBULTRONICS INSTITUTE INC



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Evaluation of Data Processing Performance— a two-day course providing an executive with the tools for an efficient review of his company's computer departments.

Scientific Inventory Management—a two-day course including discussion on warehouse, finished goods, factory supplies, service parts, and raw materials inventory Oct. 23, 24: 27, 28, Nov. 11, 12,

Operationa Research: Business Decisions—a two-day course concentrating on exploring OR attechniques to provide atternative solutions to

basic business problems. Nov. 3, 4; 11, 12; 24, 25, Dec. 4, 5; 11, 12, Don't miss your chance to polish the brass. For registration or more information call or write:

Executive Computer Systems, Inc.



800 Enterprise Drive Oak Brook, Illinois 60521. Attention: Mrs. Shannon Fischer (312) 325-6363



applications

otential problems and avoid ex-erimental dead-ends, the quick-

er we can find the answers we're

er we can find the answers we re seeking," Mrs. Jereb said. With this new approach to re-search, the engineer simply masters a few request code in-structions and retrieves answers in a fraction of the time required

to analyze information m

Time-Shared IBM 360/67 **Assists Nasa Engineers**

CLEVELAND - A computer here is belping engineers develop propulsion systems that will thrust an aircraft 2-1/2 miles in

The computer is an IBM 360/67 time-sharing system link-ed directly to research facilities to provide engineers with mean-ingful results of tests as they are

At the engineers' fequest, the system automatically checks out the calibration of hundreds of

instruments prior to the begin-ning of research testing. The system lets noncomputer-oriented engineers at Nasa op-erate a typewriter-like computer terminal and recover meaningful test results. The system is capable of serving many users at different research facilities at the

Five research facilities, includ-Five research facilities, includ-ing Nasa's supersonic wind tunnel, currently are linked to the computer by terminals. Ad-ditional research facilities are to be added later this year.

Nasa's wind tunnel test section, measuring 10 ft x 10 ft, is one of the largest of its kind. Wind speeds of Mach. 3.5, or about 2,100 miles an hour, can be achieved for testing aircraft com-

Mrs. Marguerite Jereb, systems and operations section head for Nasa, said, "The ease with which the computer can be used is an incentive for engineers to set up their own calculations, thereby reducing the time required for testing new concepts and sys-

Typical of the computer-assisted projects underway is a study of the inlet system that provides air flow to a supersonic jet engine. If this inlet is not properly designed, the air flow-ing over its surface at supersonic speeds becomes distorted. This could stall the engine.

Engineers are using the computer to observe, under actual test conditions, different inlet configurations at supersonic

The aircraft systems are tested in scale-model form. Each model is equipped with some 350 sensi-tive measuring devices that record its characteristics at various

In seconds, the computer scans a massive amount of this data a massive amount of this data and on request gives the angineer the most meaningful results of the test. This includes high and low performance indicators, as well as the level at which a omponent might experience a milfunction.

Before the computer was used for on-line test evaluation, en-gineers had to scan instrument readings visually from a variety of sources and interpret the data after the test had been com-

SUITLAND, Md. - The U.S. Navy Oceanographic Office is completing plans to chart the world's oceans using four classes of ships and two types of com-

puters.
Five large, diesel-powered and
two steam-powered research
ships and a variety of smaller
sounding boats will be used in
the system that will replace manual data gathering and chart prep-aration. The charts are produced for Navy and American mari-

time use. The larger vessels will have a dual computer system made up of two Digital Equipment Corp. PDP-9 medium-scale systems, while the smaller boats will be while the smaller boats will be equipped with small DEC PDP-8/L devices. A total of 27 computers will be employed to collect data and produce hydrographic charts.

Computerized Ships Map Seas for Navy

Using manual methods, pre-vious charts have been based on data gathered on four-month surveys. The charts have taken as

surveys. The charts have taken as long as three years to prepare. Computers in the new system are equipped with plotters so that charts can be prepared al-most as fast as data is acquired. The computers can sample data at the rate of 2,000 samples per

The PDP-8/Ls on the sounding boats will store data on magnetic tapes that will then be processed by the larger computers on the

mother ships.
The dual PDP-98 can gather The dual PDP-95 can gather and process data simultaneously. One CPU can gather data while the second analyzes it. This permits data to be stored for later off-line processing.

The system will gather infor-mation relative to the sea floor,

ane mother ships in the system vary from slightly more than 200 to almost 400 feet in length. They carry a crew of 44 and up to 30 scientists. Each will operate with several sounding boats, plastic hulled 36-ft

ressels. Each boat will operate with Each boat will operate with precise control over uncharted areas, using the motherships' electronic navigation aids. The sounding boats will venture no further than 50 miles from a mother ship and will operate in llow water.

Navy officials predict that be-sides improved charts, the new system will generate information that will be useful in planning harbor improvements; seaplane anchorages; and in sitting, ero-sion, and earth science studies.

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 Pressure to complete new projects
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iem/360.

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WHY ARE THEY USING IT

west cost per program to convert. Our clients have con-red CONVERT-A-CODE costs with the in-house manual protect and the in-house package translator approach, and the in-house package translator approach, and und CONVERT-A-CODE to be far and away the lowest cost per program. In addition, the CONVERT-A-CODE argest are total costs including all documentation and com-CONVERT-A-CODE guarantees 100% conversion for this Turnaround time to complete the convention. Because of the power and effectiveness of our translator and the skill of the team of conversion specialists who complete the work, CONVERT.A.CODE is equipped to handle large volumes of programs in a very short time.

Improved morale of the user's staff. Rather than work on less prestigious 1401 maintenance and conversion work, CON-VERT-A-COD surs can devote their staff to new System's 360 applications. This often serves to keep staff morale high and allocate their efforts to those new application projects with the greatest payoff.

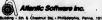
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Newton, Mass. 02160 (617) 332-5606



Ruth Originals Corp. executives discuss a computer-prepared report on the popularity of a new fall ansemble worm by two young models.

Computer Picks Favorite Little Girls' Dress Styles

HENDERSONVILLE, N.C. -A computer is being used by a children's dress manufacturer to predict the popularity of dress styles for girls from toddiers to teens.

The manufacturer, Ruth Origi-

nals Corp., believes it can antici-pate future dress sales with a formula based on intuition,

talent, and a computer.

Predictions on original designs
that will become best-sellers in exclusive specialty shops served by Ruth Originals are aided by an IBM 360/20, which analyzes

largely supplied by Ruth Combs and Daisy Sample, whose part-nership began 20 years ago with a custom home-sewing opera-tion specializing in children's

With Mrs. Combs' design with Mrs. Combs design talents and Mrs. Sample's busi-ness acumen, their made-to-order dress business has grown from a garage into two plants and a \$4-million corporation that markets 500,000 high-

fashion dresses each year.
The corporation's Ruth of The corporation's Ruth of Carolina creations are for girls ranging from toddler size to early teens. About 450 original designs are introduced each year, for spring, summer, back-to-school, and holiday sesson lines. Ronald Swartzel, Ruth Original Carolina Swartzel, Ruth Original Swartzel, Ruth Ronald Swartzel, Ruth Origi-nals controller, said the com-puter helps the company predict the popularity of any dress style and size by comparing sales esti-

Preseason estimates of dress sales are entered into the comsairs are entered into the com-puter, along with actual orders as they are received from cus-tomers. The computer compares the orders against estimates and prints out a daily report indicat-ing customer interest in each

style and size.

Mrs. Combs, whose nam Mrs. Comos, whose name and designs are trademarks of Ruth Originals, said production deci-sions must not interfere with the design, styling, and quality of

"But in the final analysis," she said, "what we produce depends on what our customers want to buy. The computer helps us determine in advance the styles they find more affection."

For example, when new Ruth of Carolina creations are being worn back to school this fall: the worn back to school this fall; the computer, will be analyzing the most popular fashions planned for next spring. Meanwhile, plant work already has started on new dresses and coats for the holiday season.

Advance information prepared by the computer also allows Mrs. Combs to pinpoint the amount of fabrics and special materials necessary to produce each sea-son's orders without having cost-ly supplies of piece goods left

over.

Befides sales projections, the computer is used to determine priority of dress orders shipped by style and size to some 2,100 retail customers throughout the

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Bankers Told Computer Analysis Vital to Check Price Movements

GENEVA, Switzerland — Europeen bankars wers told at a recent banking seminar that the trust officer who falls to use techniques afforded by computer systems to halp reduce the uncertainty surrounding movements of stock prices is depriving his clients of the latest benefits in financial analysis.

financial amilysis. Also Fearstein, vie-president of Talest Systems, Inc. of Alan Feuerstein, vie-president of Talest Systems, Inc. of Alan Feuerstein, vie-president of Talest Systems, Inc. of the Inc. of I

blocks of information."

Among managerall objectives of computerized financial snalysis, seconding to Feueristin, are: Determining veriables infelled to influence the matter value of a company, focusing infelled to influence the matter value of a company, focusing performance, perdicting critical financial variables in time to obtain an "exploitable effect", and managing portfolio dynamically within the framework of en efficient balance between eith ketter and returns to capital.

Brandon Forecasts Service Market Multiplying Six Times by 1980

puter industry spokesman pre-dicted a minimum six-foid growth of the data processing support services market by 1980. Dick H. Brandon, president of Brandon Applied Systems, Inc. of New York, spoke before the

hicago Science Analysts.
He said the present \$2.8-billion market would grow to between \$16 and \$20 billion by 1980. Discovery of this potential, he

suggested, may have been the determining factor in IBM's recent unbundling decision. In-tense competition will eventually cause a major shake-out among the 2,500 companies in

Brandon said the ranks of sup-pliers would thin dramatically.

At present, he said, about 70 support service companies had annual revenues of more than \$1 million each. This could shrink to fewer than 40 by 1975, including some four to eight com-panies with annual revenues of \$250 million plus, and 10 to 20 with revenues over \$50 million.

Describing his own company's prospects during this shake-out period, Brandon shid that his company, founded in 1964, has already grown to the 11th largest independent service firm. Revenues for the current fiscal year are projected at about \$7 million.

Company plans call for rev

fiscal 1974, he said. rmance in the curr fiscal year is in line with the official projection of 30 to 50 cents per share made at the shareholders' annual meeting on June 9, 1969, he said. For the first quarter, earnings were 4 cents per share. Earnings per share at this point are expected to run between 31 and 37 cents a share for the fiscal year ending

Randolph Signs Merger Accord With Travelers

HARTFORD, Conn. - The Travelers Corp. and Randolph Computer Corp. have signed a

merger agreement.

The agreement was approved in principle September 5, 1969, hy the boards of directors of both companies. As previously announced, it calls for the exchange of 1.25 shares of Travelers common stock for each share of Randoiph com-

mon.
Randolph filed preliminary
proxy material with the SEC on
September 8, 1969. The
schedule of the transaction contemplates the mailing of Randolph proxy, material in Octoher, a Randolph stock-holders' meeting in November, and merger shortly thereafter.

Individual Portfolios Subject of Monthly Analyses

HIGHLAND PARK, III. - Now

you can have a computer tell you where you stand in the stock market. Input Inc. is offering a new service that provides monthly computerized analyses of indi-

computerized analyses of indi-vidual portfolios.

Called Comp-u-gain, the service provides a monthly computer-ized report showing cost and current value of each holding, anticipated dividend or interest income, realized long and short-term gains or losses for the year, and unrealized gains or losses

At the end of the year, Comp-

u-gain provides the Schedule

ugain provides the Schedule
"D" tax report.
"Input, Inc., located at 500
Old Elm Road here, has been providing this service to brokers, providing this service to brokers, banks, and corporate investors for the past two years," said Irwin Schier, president of Input, "Now our Compugain division makes this service available to the individual investor."

When he subscribes to the serwhen he subscribes to the ser-vice, an investor furnishes Comp-u-gain with a listing of his present holdings, including the cost of each holding. He also arranges with his brokers to furnish Comp-u-gain with copies

or all tuture trades.

From then on, according to Schier, the process is automatic.

Each month, Comp-u-gain's computers check the current security prices against the investor's costs and produces the monthly report.

The computers keep tabs on all listed stocks, 7,000 over-the-

of all future trades

counter stocks, and corporate honds. The computers automatically adjust for stock splits, dividends, mergers, and rights offerings, he says,
"Many individual investors do

not know, on a monthly basis, what their iong- and short-term

profits and iosses are," said Schier, "yet they have a lot of money in the market, and they up-to-date and detailed cisions. Comp-u-gain reports give them this information, with no them this information, with no work or effort on their part," he

The service costs \$12.50 a month and the cost is tax de-ductible. Schier claims that an investor can save far more than the cost of the service in better investment decisions and better tax planning.
Schier says the service will be

Standard Computer Viewpoint

Standard Computers Appeal to 'Sophisticated' Users

Special CW Correspondent SANTA ANA, Calif. - It could be called the "sophisticates" computer company, but Standard Computer Corp. prefers to say, "Our users are knowledgeable people. They're costconscious and more self-reliant ey are all old pros, regardiof whether they are working for a corporation or heading a service bureau

in their customers and that of other manufacturers is that Standard computers incorporate a major innovation in machine It is loadable microprogram

ming that serves as a second computer inside the mainframe to free from hardware bondag the machine logic and operation

These operations, as in current use on other machines, act as overhead to the program being processed. In Standard's comprocessed. In Standard's com-puters, they are high-speed pro-cessed using the inner computer, while the "number crunching" goes on in the main body of the

specific environment, giving him faster processing where he needs it. This is different from other computers where all users are rigidly locked into identical

hardware specifications.

"We expect all computers to be using this concept in five to ten years," said Bill Otterson, vice-president of marketing, "Our prime challenge now," adds Chuck Taft, director of market-ing services," is making the general computer user market well enough aware of loadable micro-

rogramming, or 'inner com-uter' capabilities and potential First Was Succes

The flexibility of the micro one itexhibity of the micro-programmed inner computer is such that with their first com-puter, the IC 6000, they were able to emulate IBM's 7090, 7094, 1401, 7040, and 7044. The speed was such that, as an example, they could emulate the 7094 and move through some logic operations in 60% of the e required on the 7094 (the 7094 costs five to six times as

Eight IC 6000s have been sold,

mostly to aerospace corpora-tions. The second computer hrought out by Standard is the IC 4000, 18 of these have been

Now Standard is jointly an-nouncing with Call-A-Computer, a large independent time-share service bureau, the iC 7000 7000 time-share systems, il of these have been sold 10 of them

to C-A-C. Standard is four years old. It has grown from two employees to 140.

They operate nine offices throughout the country and are looking into a joint marketing agreement with a foreign repre-

sentative.

Standard is an innovator. It was started by two men, Laszlo L. Rokoczi and Dave Keefer, both from GE. They took their microprogramming concept to GE and, when it was rejected, decided to form their own com-

pany.

The first thing was to prove the microprogramming concept, and a computer was needed to do this. One computer was built before there were any announce-

They innovated the idea of

as the customer's operator. This efficiently uses the engineer's time with benefits to all concerned.

Innovative Concept

The concept of the IC 7000 is another innovation. This is the first time a user and a mainframe manufacturer have worked together to design an optimized system for a special class of user. As service bureaus have to op-erate at a profit with strenuous demands on the system, it is designed specifically for this cost-conscious, high-throughput

Another Factor

"There is one other differ-ence," points out Otterson, "With all the other computers, when a user grows from one-terminal use to needs for an in-house computer, he has to switch to another software sys-

With time-share service bureau operations, including those op-erated by the mainframe companies, the service bureau soft-ware is considered proprietary. Users switching to th

computers have to take the general package offered for all users. With the 7000, the user that grows into a need for his own system stays with the same software."

Price Background

Standard computers rent for between \$10,000 and \$25,000 a month with purchase from \$400,000 to \$1 million. The IC 7000 accommodates as many as 80 simultaneous users with Basic, Fortran, Cobol, Test Edit, Implan, and Assembler

languages. A 65K (36-hit word) version with two IBM 2314 disk modwith two IBM 2314 disk mod-ules, and 800 card/min reader, a 1250 line/min printer, a punch, and two 60KC tape drives can be purchased for \$699,900 or availpurchased for 3699,900 or avau-able on a five-year lease plan at \$14,700 a month. Highly expanded versions will be offered for larger time-sharing

Call-A-Computer will have the Call-A-Computer will have the service available under two plans: one for individual-terminal users, and a remote pro-grammable concentrator that in-creases access speed for those with 10 or more terminals.

Market Mixed, No Big News Unbundling Is Still in the Talk Stage

Sy A.S. Williams
CW Staff Writer -The battle lines are becoming somewhat clearer, IBM's position is stated (most strongly at the small-user level) as "Build user self-reliance and independent of the small-user and independent of the small-user level."

dence."
It's certainly at this level that
each support dollar takes the
most out of the profit margins.
At the corporate planning
level, the manufacturers are
using unbundling, each to the

extent it believes to be its own best (most profitable) interests. Some have also made it appar-ent that they need the last quarter of this year to make up their minds, as to procedure and timing of full product announce-

Honeywell & Univec

Esch has announced that life will proceed as was, Honeywell with a small general incresse in hardware prices. They both appear to believe that their best path is to raise volume by going "at 18M with guns primed by "full support." This has been one of Honeywell's mejor competitive strengths end has contributed well to its sales (while adding to the length of time required in make a rental contract truly rofitable),

NCD

The most recent and least de-The most recent and least de-tailed announcement on un-bunding has come from NCR. The only quid and quo is an approximation that \$1,000 of monthly rents! will entitle the new user to about 30 man-days of systems support. Beyond that, only a vague statement that each user requires.

stetement that each user requires "c certain essential emount of systems support and educational assistance" to realize gain on his invest ment. "E. "NR" is press release leads one to believe that it will price education (above some minimal level) and software "including both applied programs and com-puter languages."

But there is no definitive state-ment on whether what is now free will remain so. And no mention is made of the ongoing mention is made of the ongoing cost (to the menufacturer) of a customer installetion's monthly maintenance. So NCR has left anelysis of unbundling on profits up for grabs for a while.

Burroughs

Burroughs is one of those com-panies on the fence. Its computer peroduct line has been rather segmented — only the 2500, 3500, and 6500 have been mentioned by number for unbundling in an internal policy. Buyers will, until some further notice, be able to get support on the old, bundl

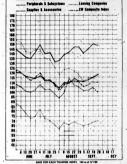
Its accounting machines are relatively unbundled. It does seem strange that a manufac-turer should foot the bill for changing hard-wired things, such as changes to a payroll job made necessery by changes in tax laws.

The Others

GF has said no unbundling. Gi: hes said no unbundling, but quite healthy price in-creases. CDC hes said it will unbundle, but has given no de-tail. RCA hesn't said much about separate pricing.

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EXCH RANGE PRICE ### 125 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 200 | ### 20

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0	44- 2	6 28 1/2	DATA DOCUMENTS	. 1		5.64
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A	89 - 62		AUTOMATIC DATA PRO	- 5.1/4	
0	15- 1		AUTO SCIENCES	. 3/4	. 8-35
6	17- 7	7 1/2	BRANDON APPL SYS	- 1/2	-6.25
	21- 9	12 5/8	COMPUTER APPL	- 1/6	-2.55
0	16- 6	9 1/2	COMPUTER SHALLOW	+ 1/2	5.56
o	474 15	17	COMPUTER NETWORK	+ 2	13.35
N	30- 19	22 1/2	COMPUTER SCIENCES	- 1/8	-5-74
0	48- 5	10	COMPUTER USAGE	+ 1/2	4.55
A	59 - 57	54 1/2	COMPUTING & SOFT	- 1/2	91
0	24- 1	5 1/4	DATAMATION SERVICE	- 1/4	-15-58
0	17- 6	T 1/4	DATATAB	2 3/4	-9-38
0	15- 5	5 1/4	DIGITER		
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0	50- 17	17	INFORMATICS	1/4	-1-45
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N	38- 23	35 5/8	FLANNING RESPARCE	. 5/4	-2.06
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0	10- 4	5 7/4	SOFTWARE SYSTEMS	. 1/4	
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00	12+ 3	3 5/4	UNITED DATA CENTER	+ 1/8	3.45
N	155- 56	69	UNIVERSITY COMP	+ 1 T/2	
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0	9.		4	1/3	LECTPO FEMP LEAS		***	
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	43-	18	37	1/2	RANDOLPH COMPUTER		1 7/8	-4.8
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HEEK

Exchange Report--Part II

Rockwell Study Calls for EDP Throughout Exchange

Stock Exchange recently re-leased a study, prepared by North American Rockwell Corp., recommending a nation-wide overhaul of the financial community's operational pro-

The major steps indicated that electronic data processing should be heavily applied.

The report stressed the reduction of errors at the source of a transaction by on-line computer editing of orders, a centralized automated clearance of securi-ties linked by computer, a com-puter-oriented floor trading procedure, elimination of securities flow by a system of transfer agent depositories electronically tied to the clearing service, and the establishment of standardtransfer registrar facilities using ne-readable stock certificates, attachments, and in-

Locked-In Trade

The study concluded that present manual order processing and reporting procedures require unnecessary expenditures of time, effort, and dollars; contribute to the error problem; and provide redundant input into the

A major recommendation calls for a floor trade reporting sys-tem – the long-sought goal of a locked in trade.

Following the execution of an order, each broker would enter on his precoded order ticket the price of the trade and the iden-tity of the other broker.

' Relayed by an exchange re porter to a computer terminal inside the trading post, both tickets would be read into the system where an automated edit ould be performed.

The computer would check to see that both tickets were for the same security, that one was a buy, the other a sell, and that the quantities and prices

Assuming the trades compared would be an automa distribution of the report to the ticker and to the clearance, sur-veillance, and other information

The transmitted data would have complete, compared trade

In this way, accurate, complete records of trades would be captured at the point of execution. Uncompared trades would be Uncompared trades would be resolved within minutes instead of days. Most of the purchases and sales functions for listed accurities in brokerage firms would no longer be required.

allocation, and balance orders would be completed on the evening of trade date. Accurate forecasts of certificate and dollar movements could be made for a week in advance

Computers could be used to trade report to detect and provide for the rapid correction of errors, thereby freeing up people

erican Exchange has authorized North American Rockwell to initiate the neces-

sary design for such a system. Transfer Agent Depositories

The report states, "The major step that can be taken to ease the settlement process is to remove certificates from Street traffic into depositories where securities transactions can be handled by bookkeeping en-tries."

The study team prop system of transfer agent deposi-tories, established on a national

linked by an on-line communicas network to the clearing and settlement services and then would receive, store, segregate for loan, and transfer certificates.

cates The bulk of certificates would be moved out of the hands of individual investors and into the

denositories. The report added, "Such a depository system must have the backing of the entire industry – brokerage firms, banks, ex-

changes, and major institutional investors," Broker's collateral loans could be handled without withdrawing the underlying certificates from the system. Verification that the shares are in a broker's acco would be obtained electronically from the clearing service, and proper segregation of the pledged shares accomplished by

the transfer agent depository. Consolidated Facilities

The study recommends devel-opment of an automated transfer system, stating, "The key to this process is the development hine-readable stock certificates and transfer instructions.

The program calls for auto-

tory controls, and the consolida-tion of the transfer and registrar functions. The objective is the establishment of a production

line process on an automated Public customers would be an couraged to leave certificates with their brokers to reduce the

The report underscored the ritical need for machine-readable certificates and other documents, but stressed that develop-ment of the total system should come first, followed by certificate design as an integrated com-



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Earnings Reports

COMPLITING & SOFTWARE INC ths Ended July 31 1969 a1968

Restated to include com-uired on a pooling-of-in-is; b — Based on average co

FARRINGTON ANUFACTURING CO

ed to reflect pooling of DATRONIC RENTAL CORP.

Year Ended June 30 1969 1968

\$.44 2,779,211 259,956

TER EDUCATION INC. 1969

1968

INTERCONTINENTAL SYSTEMS INC.

1060

8.17 8.27 87,167,491 4,582,057 354,861 569,877

DATATAB INC

992,990 111,453

1969 a1968

\$.43 7,774,999 493,399 5.92 18,603,110 60,543 a1,132,571 .82 15,102,685 948 669 ests basis; b — Based on me before special credit; c — Pro s from life insurance policy; e — si to 97 cents e share.

TERICAN BIOMEDICAL CORP. Ended June 30

tated to reflect pooling-of-BECKMAN INSTRUMENTS, INC. Year Ended Juna 30

.50 36,585,714

300,000

Earnings 1,723,535 586,42 a - A loss of nine cents deducted du to the franc devaluation; b - Los due to the develuation of the Franc

COMPUTER APPLICATIONS INC. 9 Months Ended June 30 a1969 D1968

8.31 31,345,546 460,172

NCC LEASING, INC.

1969

WELLS MANAGEMENT CORP 3 Months Foded June 30 1966 1969

as.33 s.30 1,729,111 1,154,291 257,613 220,819 a — Giving affect to full pote dilution, including unaxercised tions and warrants.

MOHAWK DATA SCIENCES Year Ended July 31 1969 a1968 BRADFORD COMPUTER & SYSTEMS, INC.

GERBER SCIENTIFIC INSTRUMENTS onths Ended July 31 1969

FLECTRONIC COMPUTER RONIC COMPUTER
IMING INSTITUTE, INC.
INTHE Ended June 30
1968 8.04 799,918 25.991 axtraordinary \$107,173, eq

PRODUCTS, INC.

1969

One 9600 bps modem contains enough power to cure five nmon ailments.

COMMON AILMENT #1 SPASTIC DATA FLOW

When communications data is being transmitted or received by the computer, any simultaneous data processing efficiency is reduced. And the longer it takes for input/output, the longer data processing takes. At 1200 characters per second (9600 bps) data transfer is completed up to four times faster. That leaves the computer free to process more data, faster. It can do more work, more jobs - in less time. Maybe even save you from buying another computer.

COMMON AILMENT #2 HARDENING OF THE PERIPHERALS Line printers can run at 600 lines/minute. Card readers can

operate at 800 cards per minute. A 2400' reel of magnetic tape with 800 bpi can be transmitted in 30 minutes. But when they're running through 2400 bps moderns, they don't! A Codex 9600 bps data modern will bring your peripherals up to their fully rated speeds.

Hewlett-Packard Installs 7 T/S Systems for Leasco

sharing group has taken delivery on seven of Hewlett-Packard Co.'s Model 2000A time-shared

They are part of a long-term purchase agreement involving nearly i00 systems, the two

ompanies announced, I.S&R, based in Bethesda, Md., nputer-oriented subsidiary of Leasco Data Processing. Equipment Corp.

The systems average more than \$80,000 each, with the price varying somewhat depending upon the peripheral equipment included with the individual

Most systems will incorporate

expanded memory capacity, uti-lizing both magnetic tape and disk storage units. Each system can serve 16 users simultaneous-

The seven systems already de-livered are serving LS&R cus-tomers in the Washington, D.C., New York City, and Boston

computers in several eastern cities it leases time-sharing terminals and sells computer time

. Hewlett-Packard Company, headquartered in Palo Alto-Calif., is a major designer and manufacturer of electronic, medical, analytical, and computing instruments.

Orders and

a Datanet-30 data communica-tions processor from the General Electric Co. for use as a message witching system.

medical services firm, will install a Computer Machinery Corp. a Computer Machinery Corp. KeyProcessing system at its facility in Van Nuys, Csiif. One of the primary functions of the system will be to prepare data for Medicare and MediCal appli-

Monmouth College, W. Long Branch, N.J. has signed a con-tract with Honeywell to lease a Model 120 computer for the college's computer center.

Filter Dynamics International.

Inc. of Cleveiand, Ohio, and the J. George Fisher and Sons Co. of Fiint, Mich., have taken delivery on NCR Century 100 systems for general office payroll arid inventory procudures.

inventory procudures.
Ctrice & Corp. of Phoenix,
Aris.; Computek Corp. of Tulsa,
Okla.; Amerillo College of Amerillo,
Grexae; The Institute of
Computer Technology of Akron,
Ohio; Aldershot Borough Council of England, have
concluded of Enex., England, have
concluded of Enex., England, have
systems for general office and
accounting procedures.

The National State Bank of Linden, N.J., has added a third General Electric information

system, GE-405, to its con complex serving all of the bank's branches and its Elizabeth, N.J.,

Bucknell University will use its Scientific Data Systems Sigma 7 for student instruction via time-sharing, remote batch operasharing, remote batch opera-tions, on-line processing of busi-ness records, research, on-line library circulation control, and real-time interface to an analog

Wilson and Horton Limited, a New Zealand publishing com-pany, has placed an order for an ICL 1901A for applications including debtors' accounts, advertics, financial accounts, and

Lutheran Medical Cent Lutheran Medical Center, Brooklyn, N.Y, has wired itself into GE's Medinet application operation in Watertown, Massion to automate its growing billing activities. Leased telephone lines connect terminals located within the hospital to Medinet's center.

Administrative Systems, inc. New York, a computer service bureau, has installed a second CDC optical page-reader system to offer data scanning capabilities to its customers.

A CDC 3200 has been installed at Prakls, a geophysical contract-ing firm in Hannover, Germany. The CDC 3200 has been added the CDC 3200 has been added to the previously acquired 3200 and 3300 systems which analyze vibrations recorded on magnetic tape from underground and nu-dersea explosions.

Internation Computers Ltd., Internation Computers Ltd., London, has delivered a system 4-50 to South Western Gas Board's head offices at Sydney transfer customer billing and network analysis work from South Western's Leo 3, and will also be used on a bureau basis by ICL. The system is valued at £350,000.

Roosevelt Hospital, New York has purchased an SDS Sigma 5-computer system to assist its medical staff in monitoring, diagnosing, and caring for pa-tients with acute cardiovascular and respiratory disorders.

A \$1.1-million Univae i 108 has been ordered by the Swedish Government - Agency for Or-ganization and Management (Statskontoret) for installation at the University of Lund in, southern Sweden. The 1108 will be used for research and educa

The Common chusetts has placed an order for a Burroughs B5500. The Depart-ment of Public Safety will use the B5500 as the heart of a

Computer Center Corp., Seattie, Wash., has installed a second PDP-10 and RB10 disk sharing utility serving the Pacific Northwest will use the equip-ment for on-line storage of users' data and programming and to

COMMON AILMENT #3 THE SLUGGISH CRT SYNDROME

CRT display-based information systems that share a common line to a computer also get to share a couple of problems: response time and thruput. With transmission to the central computer limited to 2400 bps, turn-ground is badly delayed, reducing thruput. Bring it up to 9600 bps and your system timing is vastly improved. Watch your CRT's respond to a 9600 bps injection

COMMON AILMENT #4 SWELLING OF THE PHONE BILL

Installations suffering from multiple 2400 bps thrombosis between network nodes ordinarily use four 2400 bps channe running parallel. A very impressive reduction in lease cost can be made by adding the four channel multiplexer option to the AE-96. The TM-4 concentrates four 2400 bps data channels into a single 9600 bps data stream ready for transmission over a single line. Network reconfiguration like this can save literally thousands of dollars every month, and can give you additional circuits that might not be available by any other means.

COMMON AILMENT #5 UNREQUITED COMMITMENTS

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RCA Opens \$12 Million Peripheral Plant

MARLBORO, Mass. - RCA has dedicated its \$12-million computer peripheral equipment plant here.

The new peripheral equipment The new peripheral equipment engineering and production facility represents "one of RCA's principal moves in preparation for the decade of the 70s," said RCA President and Chief Executive Officer Robert W. Sarnoff. The 250,000-ag-ft facility, lo-

The 250,000-sq-it facility, lo-cated between Boston and Worcester. on Route 495, has been operating since May when the nucleus of the present Mari-

the nucleus of the present Mari-boro force began moving over from temporary headquaters in. the Framingham industrial Park. Located on 128 acres, the plant has been designed to speed production of computer periph-eral equipment in a highly ef-ficient and economical manner, the production of the production of the tree, rising a middt natural gratite formations that form a 40f-ft-deep base, expands floor 40-ft-deep base, expands floor by floor as it goes up the side of a hill overlooking Rt. 495.

Some 1,200 persons, including state and local dignitaries and plant employees, attended the

Other Expansions

MSA Computing Co., Allanta, a division of Management Science America, Inc., has opened an electronic data processing facility at 1104-Spring St., Silver Spring, Md., its fifth service center in the Washington, D.C., area. The new center offers a wide range of electronic data recreative services and linear contents of the content of th processing services and time sharing capabilities on a limited

Ticket Reservations Systems, Inc., has leased 10,000 ag ft in the Seagram Bidg. 375 Park Ave., New York, for its corporate staff. By the end of this year, 1,500 electronic box offices in 20 metropolitan areas are expected to be in operation.

Computer Response Corp., Washington, D.C., a company offering high-speed batch pro-cessing and systems management services, has announced the move of its New England office to New England Executive Park in Burlington Mass Burlington, Mass.

Prime Information, reime information, Inc.,
Princeton, N.J., has joined Applied Logic Corp.'s nationwide
time-sharing network, in order
to provide time-sharing software
for basiness managers, school
administrators, chemists, and physiologists

Infodata Systems, Inc. has an intouata Systems, inc. has an-nounced the opening of offices at 1901 N. Fort Myer Drive, Arlington, Va., to provide for additional professional staff due to business expansion in Wash

Dura Division of Intercontin tal Systems, Inc., a manufacturer of computer terminals, com of computer terminals, com-puting typewriters, and auto-matic electronic typewriters, has opened a 50,000-sq-ft manufac-turing facility in Greeley, Colo.

Logic Corp., a manufacturer of data input systems, announced the opening of regional sales offices at 929 W. Broad St., Falls Church, Va., to serve all branches of governmental activi-



Computer Image Corp., which develops computers designed to produce animated images for television, educational and in-dustrial films, and videotapes, plans to double its facilities due to the rapid growth in opera-tions during the past six months. The new facility will be located at 2145 S. Platt River Drive, Denver, Colo., adjacent to the current facilities at 2162 S.,

Data 100 Corp., which manu-factures remote data processing terminals for real-time and batch ieminals for real-time and batch applications, has opened regional sales offices in Minnespolis, Minn, and Washington, D.C., to serve customers in the Midwest regions, Dentils N. Elder has been appointed Midwest regional manager, David L. Bier Washington, October 10,900 and 10,900 and

Inc., a subsidiary of Management Data Corp., which provides in-dustry with psychological consulting services, has doubled its office facilities in the Philadel-phia area. Their expansion program calls for offices next year in the Atlanta, Boston, and West

The Standard Register Co., a business-forms firm is reorganiz-ing its Oakland-headquartered Pacific division. Plana call for construction of a manufacturing/ warehouse facility in Hanford. Callf., to improve service to West Coast customer

Applied Logic Corp., a time-sharing utility, has opened a western regional office at 2680 Baysbore Frontage Road, Mountain View, Calif. 94949, to offer technical and marketing support to customers and associ-ates west of the Mississippi.

Data & Information Prod Data & Information Products Inc., a wholly owned subsidiary of Applied Data Research, Inc., has moved Ita castern regional and New York branch sales offices from 450 Seventh Ave. to 360 Lexington Ave., New York. ADR will continue to maintain its systems and research office at its systems and research office at 450 Seventh Ave.



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York, N. A. WSTEMS, INC.
12-20 River Road, Fair Lawn, N.L. a
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12-20 River Road, R

York, N.Y.

DIALOG.COMPUTING, INC., 1305
Post Road, Fairfield, Conn. 06430, 8
Post Road, Fairfield, Conn. 06430, 8
Date Road, Park. 1212
Little Road, Park. 1

LILIE ROSE, AFF.

CALDWELL COMPUTER CORP.,
4300 North Central Expressive, Dail18, Tasas 73206, a company thatsesses EDP doubment, fire to registiesses EDP doubment, fire to registiesses EDP doubment, fire to regisminated debentures and 20,000 outlanding shares of common stock,
rocecod, at 85 per share maximum
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Conrac Corp., New York, has completed the acquisition for completed the acquisition for cash of Elektron Co. of Weiker, sheim, West Germany. a Euro-pean producer of electronic teaching systems. Conrac manu-factures precision instruments, controls; information display decontrols; information display de-vices; computer peripheral equipment, and machine tools for aerospace, government, and industry. Conrac's sales in 1968 were over \$50 million.

Computer Property Corp., a. New York firm that sells and leases computer systems and provides. complete software packages, has reached an agreement in principle to acquire List Management, inc., Rye, N.Y., a Management, ine., Rye, N.Y., a privately owned company en-gaged in the management of computerized business lists for direct mail use. CPC will acquire 100% of the outstanding stock of List Management in exchange for a maximum of 50,000 com-mon shares of CPC.

United Data Centers, inc., a New York-based network of data processing centers, has canceiled an agreement to merge with Computer Servicenters, Inc., a data processing network based in Greenville, S.C.

Albert E. Zinggeler, North Caldwell, N.J., has acquired Au-tomation Papers Co., inc., Ceder Grove, N.J. Automation Papers supplies small rolls and fan-foided items used in NCR, Bur-roughs, and IBM equipment.

Data Devices, Inc., Tarzans, Calif., has acquired the com-puter ribbon division of Colum-bia Carbon Co. of Los Angeles. Data Devices is a supplier of computer-related accessories and supplies to the EDP market.

COMPUTER TERMINAL 5' TEMS, INC., 81 N. Broadway, Hic ville, N.Y. 11801, a company t designs and manufactures medis speed line printers, high-speed sa

Drake, inc., Lest Grange, N.J.
TIMESHARE DEVICES, NPC., 225
Creccent St., Waithem, Mess 02184, a company that design, manufactures, and sells terminal devices and systems for time-shared computers, lifed to register 150,000 shares or common stock. Proceeds, at 161 per share, intended for equipment, naw facilities, sizes and advertising costs,

The Department of the Nary has awarded a contract of nearly 33 million for the production of automatic data recording equipment from Librascope, Singer-General Precision, Inc., Glendale, Calif. The contract is for the Librascope data gathering system for use in weapon system accuracy trials.

Comcet Inc., Rockville, Md., has received an order from Infor-mation Network Corp., Phoenix, for 40 computer communica-tion processors. The equipment, valued at \$2,642,000, will serve as the communications system for IBM 360 computers.

The U.S. Army Electronics Command, Fort Monmouth, N.J., has awarded a lease con-

tract for nine medium-scale B3500 systems to Burrough tract for nine medium-scale B3500 systems to Burroughs Defense, Space and Special Systems Group, Paoli, Pa. The computers will provide the continental U.S. armies and major overness commands with increased capabilities to operate the Active Army Personnel Reporting Systems and major command Information systems. The systems are valued at '\$6.1 mil-

lion.

The European Space Research
Organization, Paris, has ordered
a system in which computer
terminals will be used for scientific searches through 500,000 technical references from Nasa. Lockheed Missiles & Space Co.'s information sciences laboratory, Palo Alto, Calif., developed the

information retrieval system. now being implemented under the name of Nass/Recon for

The Univae information services division of Sperry Rand Corp., Philadelphia, has been compared to the compared to the compared to the compared to the left of the compared to the left of placed.

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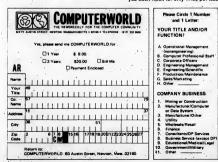
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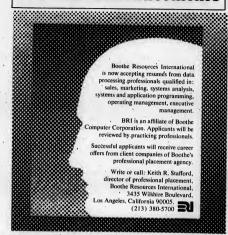
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- 6. ENGINEERING DEVELOPMENT PROGRAMMERS: Software to support stee of the or remote terminal design, development and testing. Program design for latent rehoused compared to the program of the steep of section of the program of the program of the program of the section of the program of the section of the

ECP PROGRAMMING WRITERS: Prepare technical menuals and sales material on new or modified systems, devices, equipment or installation. The material is to be used primarily by Customer Service Technicians and Field Personal. The materials is to be used primarily maintenance. Obgree plus 2-3 years' experience in EDP welfilms.

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*MAGNETIC TAPE AND DISC HEAD ENGINEERS Design and develop read-write heads for use in digital tape units and flying heads for use in disc memories. BS degree required.

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*APPLICATION ENGINEER

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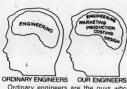
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IBM Promotes Cary to Management Group: Beitzel, DP General Manager

ARMONK, N.Y. - Frank T. Cary and George B. Beitzel have advanced to new executive posi tions in major promotions at

Cary, IBM senior vice-presi-dent, has joined the corporate office and becomes a member of the management review com-mittee. He had been general manager of the data processing

Beitzel, IBM vice-president, Beitzel, IBM vice-president, succeeds Cary as general manager of the data processing group. He had been assistant general manager of the group. The IBM Corporate Office, the top adminstrative body of IBM,

top administrative body of IBM, consists of Board Chairman Wat-son, President T. Vincent Lear-son, Board Vice-Chairman Arthur K. Watson, and now,

The management review com-mittee is the formal mechanism through which members of the corporate office collectively con sider key corporate policy and operational matters.

The data processing group, now headed by Beitzel, develops, manufactures, markets, and ser ces IBM computers and data processing products. It in data processing products. It in-cludes the components, data processing, field engineering, systems development and sys-tems manufacturing division,

and the group staff.

Cary joined IBM in 1948 as a Cary joined IBM in 1948 as a sales representative in Los An-gelea and held a number of management positions before his promotion in 1964 to president

promotion in 1964 to president of the data processing division. He was elected IBM vice-presi-dent and group executive in 1966, senior vice-president and general manager of the data pro-cessing group in 1967, and mem-ber of the IBM board of direc-

Cary, 48, received a B.S. degree from the University of California at Los Angeles and an M.B.A.



Frank T. Cary

from Stanford University Beitzel joined the company in 1955 as a sales representative in Philadelphia. After serving in several management posts, in 1965 he became vice-presi-dent – market operations for

the data processing division He was promoted to president of the division the following



year, and became 'a eral manager of the data process ing group in 1967. He was elected an IBM vice-president in

Reitzel received a R A degree from Amherst College and an M.B.A. from the Harvard Graduof Business Ad ministration

Marathon Oil Co. of Findley, Ohio, has appointed James M Mosser manager of its recently established programming depart ment in the company's com-puter services organization Mosser joined Marathon in 1959 following his graduation from Miami University with a B.S. in

solidated Edison Co. of New York has announced the appointment of Morris Dantzker appointment of Morris Dantzker as director of systems and data processing. Prior to his appoint-ment, Dantzker was manager of computer technology for the Auerbach Corp. of Philadelphia, and in 1967 served as chief of the Office of the Special As-sistant to the Chief of Staff for

able in the following areas:

Army Information and Data Systems. He is a graduate of the College of the City of New York and holds an M.B.A. degree from Ohio University

Dain, Kalman & Quail, Inc., a Minneapolis-based regional in-vestment banking firm, has named John P. Hake to the new named John P. Hake to the new post of director of management information systems. Hake will be responsible for information and reporting control ayatema and for all data processing and computer activities throughout the company's seven-state op-erating area. He was formerly manager of Information system for Pako Corp. of Minneapolis manufacturer of photo process



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Hammer, who resigned from LS&R for personal reasons, The new chief executive was president of Fox Computer Ser-

Other Moves

tions to form 1 S& P

☐ Computer Personnel Con-sultants, Inc. of Chicago has announced two promotions. William T. Geary, vice-president, has been elected to the board of

been appointed to the position of president and chief executive officer of Management Science America, Inc. of Atlanta.

□ John A. McMillin has been

named district service manager of the Pasadena, Calif., sales office of Magnetics Inc.



EDPeople

Gillis Made Development Director of New C&S Unit

LOS ANGELES - Paul Gillis has been appointed direc-tor of systems development for Computing and Software, Inc.'scessing group.

Gillis formerly was vice-presi-dent and director of develop-ment of ITT's data services division where he was responsible for the establishment of a na-tional network of time-shared information processing centers; He is also credited with the development of an on-line credit reporting system for ITT, as well as the creation of their comas the creation of their com-munications switching system, Previously, he held various technical and management posi-tions with Sylvania Electronics house's Bettis Atomic Power Laboratory, and the Univac divi-sion of Sperry Rand.

A native Bostonian, Gillis grad-uated from Boston College with a B.S. in mathematics and mathematics from Columbia.

mathematics from Columb

He is a member of the Ameri-can Mathematical Society, the Association for Compuling Machinery, and the Society for Industrial and Applied Mathe

Fox President

Of Leasco Systems NEW YORK - Dr. David Fox has been named president of Leasco Systems and Research

Fox holds a Ph.D. in mathe-matics from New York Univer-

He succeeds Dr. Frederick S. vices, Inc., which was merged with a number of other organiza-

tions to form LS&R,
For the past several months, he
served as an Assistant Vice-Presidenl at LDP headquarters.
Prior to that assignment, he
was a member of LS&R's staff as
a senior officer concerned especially with information tech-

directors. G., Alan Macdonald ind secretary.

☐ Jesse T. Hudson Jr. has

☐ Brandon Technical Services, Inc. has announced the appoint-ment of Jack O'Brien as market-

Executive Corner

ing manager for the firm's Wash-ington, D.C., office. In his new ington, D.C., office. In his new capacity, O'Brien will direct marketing activities to the fed-eral government as well as to professional and trade associations and business and industry

U.S. Systems & Software, Inc. of Los Angeles has announced the election of Well-wood E, Beall to the board of directors. It also announced the appointment of Charles T. Simmons, formerly senior vice-pr dent, as president of the firm.

☐ IBM has named Dale W Brunner, vice-president of it field engineering division, to the newly created position of vicepresident of management ser-vices. C.P. Biggar, who has been promoted to a vice-president of the division, has replaced Brunner as manager of the divi-Western region.

David C. Jones has been David C. Jones has been appointed director methods and systems for AM-EX Express Reservation Services, Inc. of Memphis, Tenn. AM-EX Express Reservation Services, Inc., a wholly owned subsidiary of merican Express Co. of York, operates one of the world's largest computerized room-reser

vation systems Stephen E. Strickman has been elected to the newly created position of vice-president and director of management systems services of Cowles Communications, Inc., of New York

O.F. Shinn has been named president of Lykes/University president of Lykes/University Computing Co., which was re-cently formed by University Computing Co. and Lykes-Youngstown Corp. to furnish commercial data processing ser-vices in the southeastern United States. The firm's headquarters will be in Atlanta

☐ James A. McFadden Jr., a founder, has been elected chair-man of the board and chief executive officer of Access Systems, Inc., Paramus, N.J. McFadden is a noted pioneer and expert in the field of financial aspects of research. He has also authored articles that have appeared in numerous trade and ness journals and magazines ☐ Hooker Chemical Corp. of Grand Island, N.Y., has announced the promotion of Mar-liss O. Bird to the position of manager-technical systems for its corporate technical systems de-

partment.

Tracor Computing Corp. of Austin, Texas, has appointed Warren A. Wasson director of marketing for the computing services group. Wasson will be in charge of the development and direction of a national marketing and sales plan for TCC's computing services.



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The new service will provide same-day response in virtually all of North America, Europe, and major industrial areas of the world, claims CAI.

A training program is under way at a CDC Institute to pro-vide full instruction for main-taining and installing CAI's 808, 816, 208, and 216 minicomputer models

Thirty-day delivery for its Model DCT-132 remote batch communications terminal has been announced by Scientific Control Corp., Dallas.

An agreement that will provide Californians with computerized income tax service was reached today by Beneficial Finance Co. on Tax Corporation of America, a Los Angeles-based com-puterized financial services com-pany.

eneficial Finance will offer TCA's computerized tax service initially throughout California. The agreement allows expansion of the service nationwide by

Com-Share, Ltd. of Canada and Com-Share, Ltd. of Canada and Com-Share, Inc. of Ann Arbor, Mich., have signed a joint-venture agreement to expand Com-Share's time-sharing service into Western Europe. Com-Share, Ltd. will own 60% of the new company, to be known as Com-Share Europe, in considera-tion of \$1 million initial capital

investment.

Com-Share, Inc. will own onethird of Com-Share Europe, in
consideration of the technology
it will make available for the
European operation. Com-Share,
Inc. will, however, beneficially
own 40% of the European company by virtue of its existing
interest in Com-Share, Ltd.

Automation Sciences Division of General Automation has reached an agreement with RCA Service Co, that will give lo-calized backup service to General Automation cus Under the terms of the agree-ment, RCA service offices at 110 major U.S. locations will provide

on-the-spot corrective and pre-ventative maintenance, as well as installation services to users of General Automation's com-puter-based automation prod-

ucts.

Each RCA depot will have, in addition to skilled technical personnel, a comprehensive stock of General Automation spare parts for quick and efficient maintenance, according to General Auto-

Digitek Corp., Marina del Rey, Calif., has expanded its com-puter time-sharing services puter time-sharing services through a licensing agreement under which Setak Computer Services Corp., Ltd., Toronto, Canada, will establish time-sharing centers offering Digitek Timeshare System commercial services throughout eastern Can-

The LGP-30 computer, originally manufactured by Control Data Corp., is now available through Mutual Computer Systems, 5500 W. 83rd St., Los

Angeles, Calif. Designed for busi ing, and scientific applications, the LGP-30 is currently being

in more than 175 installa Each LGP-30 is completely re-Each LGP-30 is completely re-furbished by Mutual, to the point that it is guaranteed to meet or exceed original man-ufacturers specifications.

N.V. Phillps (Netherlands) has N.V. Philips (Netherlands) has signed a license agreement with Sangamo Electric Co., a manufacturer of keyboard-to-computer tape input data stations, and will soon market and manufacture a full range of the apparatus in Europe. Production will take place in The Hague.

The licensing agreement covers marketing and manufacturing by Philips of Sangamo-designed data stations, Initial marketing will be for U.S.-made products,

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WHY PEOPLE of the state of the

Since the soothsayers first told us the unit record business was finished it has become fashionable to speak of it in the past tense. Fashion is one thing. The demand for economical data processing is another.

Despite what the tea leaves have said, it takes a service force of 1,000 to keep our customers happy. In the last eight months we processed 1,300 machines at our reconditioning plant.

That hardly sounds like rushing into extinction, and it isn't. But then, the unit record business is used to being called passé. Fifteen years ago the IBM 650 and the 705 were introduced and punched card equipment



was supposed to slip quietly into the Smithsonian. Now it's the System/3 and the hot shots are saying our only chance is to replace the abacus in Chinese

The unit record business has changed all right. But changed is not gone. At last count, there were over 40,000 unit record installations in this country. Punched card consumption goes up every year. Many companies, large and small, still rely entirely on punched card equipment for economical data processing. Others have found the machines serve well for back-up, and

computer editing. Much as the IBM 1401 (remember when that vanished?) is now being used in conjunction with more sophisticated computers.

And if you think the only people left in the unit record business are the brokers, you might get in touch with one of our sales representatives. He will

assess your data processing requirements and recommend the

right machines to do the job. You can rent them short or long term. Or you can buy them. Or both. However you choose to do it, we can save you money on any combination you want.

Then we back it up with a service agreement. That's why we maintain round-the-clock customer service offices in over 50 locations. And a 50,000-square foot reconditioning plant in King of Prussia, Pa. And an inventory of 16,000 unit record parts.

True, we're not likely to upstage those dazzling new computers. But meanwhile people have all that work to



get out. They want automatic data processing at reasonable prices. They want good advice, good equipment and good service. And that keeps us pretty busy. It takes a lot of hard work to run a vanishing business.

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